Drug Supply Management -I

Learning Module

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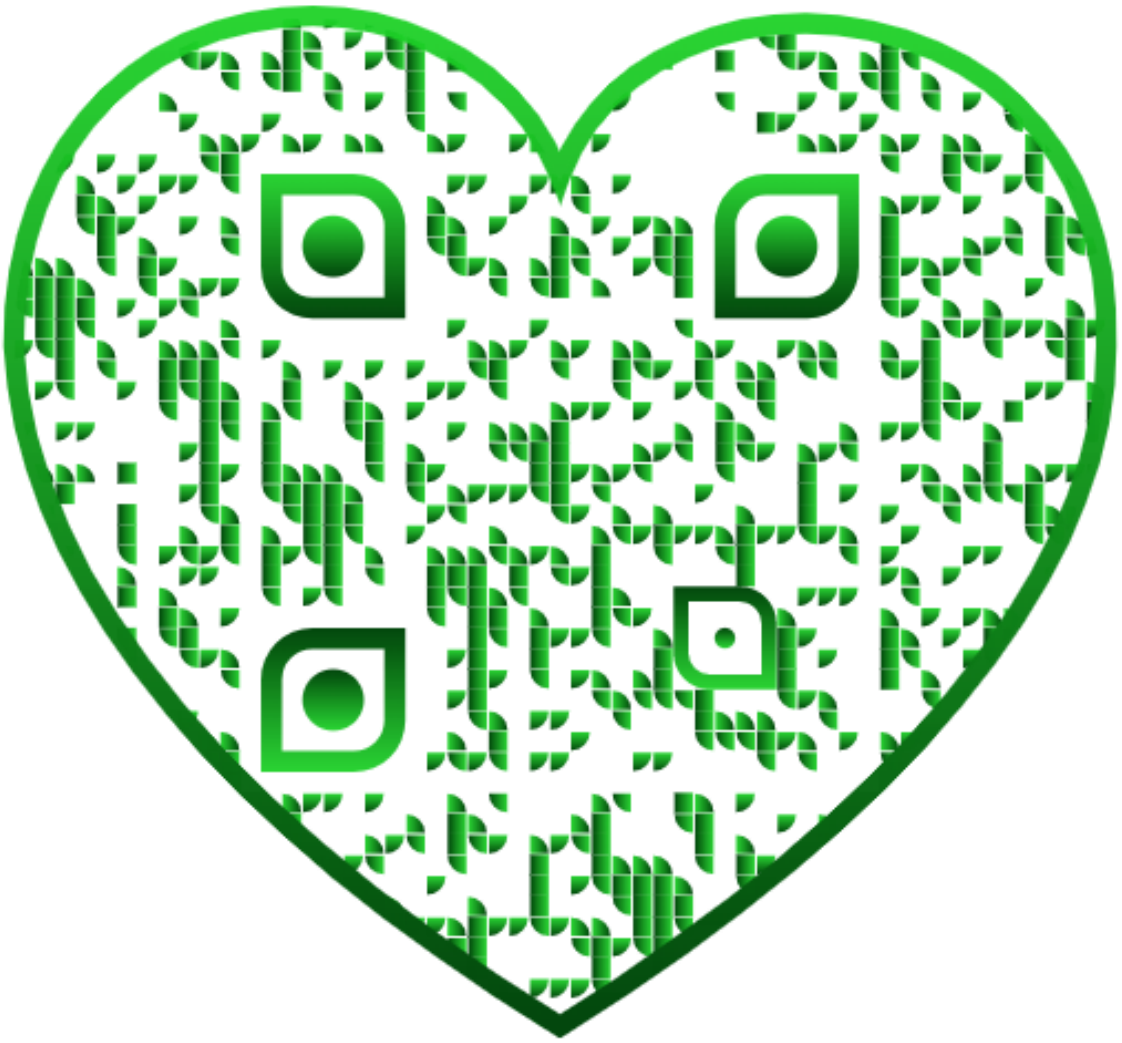

Preface

In response to the critical shortage of Pharmacy professionals in Oromia region, a group of experts from universities and colleges in Oromia region have developed an Outcome based TVET Model curriculum for Pharmacy Level II-IV programs in October, 2017 with the leadership of Oromia Regional Health Bureau.

The outcome based curriculum was developed in reference to the level based 2011 Ethiopian Occupational standard. The guiding principle in the development of the outcome based curriculum was to train Pharmacy professionals in focused, time efficient and outcome based approach, and to fill the existing pharmacy work force shortage in the region with competent professionals.

The key features of the outcome based curriculum include the use of variety of teaching/learning methods, repeated exposure of trainees to skill laboratories, practical attachment/cooperative training and the delivery of the training in standardized learning modules (information sheets) and skill lab manual/checklists (Operation sheets).

This learning module was developed by a diverse group of experts from higher teaching institutions in Oromia region, experts from Oromia Regional health bureau, OromiaTVET, Oromia COC agency and professional associations.

This Drug Supply Management- I learning Module covers one unit of competency in the level II pharmacy program. The learning module covers both theoretical and practical aspects of the competencies.

Dear Trainee, you are expected to read all information presented in the learning module, attempt all the self-check questions and perform skill activities as per the skill lab learning guide/checklist.

ACKNOWLEDGMENT

This Drug Supply Management I learning module and skill lab manual for Retail Pharmacy assisting Level II **Program** was developed by experts from Universities and Colleges in Oromia National Regional State.

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AbayKasa	AHMC
AbdiLeggese	ORHB
AbdurazakJemal Tura	Arsi University
AsratHordofa	AA University
BirhanuMotbaynor	Haromaya University
DesalegnChilo	Mettu University
Dr.WorkuBedada	Salale University
EdaoSado	Wollega University
ErmiasMergia	AHMC
GetuMelesie	Ambo University
MamoAbdi	ORTETB
MekuriaKebede	OOCAA
Mustefa Ahmed	Ambo University
ShibiruTesema	Jimma University
TeferiGuji	Jhpiego
TenaTilki	GimbiG.Hospital
TesemmaSileshi	Ambo University
ZerihunAyenew	ORHB

ABBREVIATIONS

AMC	Average Monthly Consumption
DDR	Daily Dispensary Registry
DSM-I	Drug Supply Management-I
EFMHACA	Ethiopian Food, Medicines and Health Care Administration and Control Authority
FEFO	First Expiry First Out
IFRR	Internal Facility Report and Requisition
INNs	International nonproprietary names
IPLS	Integrated Pharmaceutical logistics System
LMIS	Logistics Management Information System
PFSA	Pharmaceutical Fund and Supply Agency
PVC	Polyvinyl chloride
RDF	Revolving Drug Fund
RHB	Regional Health Bureau
RI	Request indicator
RRF	Report and Requisition Form
SOP	Standard operating procedures
STG	Standard Treatment Guideline
VEN	Vital Essential Normal
WHO	World Health Organization
WoHO	Woreda Health Officer
ZHD	Zonal Health Department

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1. INTRODUCTION TO DRUG SUPPLY MANAGEMENT

Objective:

At the end of this unit, you will be able to

- Describe Pharmaceutical management cycles

What is a drug?

A drug is defined as:

- Any chemical compound used on or administered to humans or animals as an aid in the diagnosis, treatment or prevention of disease.
- A substance used recreationally for its effects on the central nervous system.

What is management?

- Management is the act or art of being responsible or in charge and conducting or supervising something (e.g. a health center pharmacy, business, public undertaking) with a degree of skill and address.
- Management can also refer to the collective body of those who are responsible for an entity (e.g. a health center) or who exercise executive, administrative, supervisory and regulatory control (e.g. board of governors, Primary health care unit- leader).
- Generally management involves: Planning, organizing, Leading, Coordinating and controlling the activities there to be done.

Drug supply management is an act to ensure the high quality essential drugs are available, affordable, and used rationally. Medicines are backbone of health care system so that they need special attention because of the following five reasons:

1. Medicines save lives.
2. Medicines promote trust and participation in health services.
3. Medicines are costly.
4. Medicines are different from other consumer products, where consumers can select and use by themselves.

5. Substantive improvements in the supply and use of medicines through minimizing waste are possible.

Drug management cycle: -Drug management functions are undertaken in four principal phases, which are interlinked and are reinforced by appropriate management support systems. The following figure 1 illustrates the drug management cycle.

From drug selection to drug use, passing through procurement, storage and distribution, a whole range of management capacities are required and necessitateusing the appropriate tools within a given legal and policy framework.

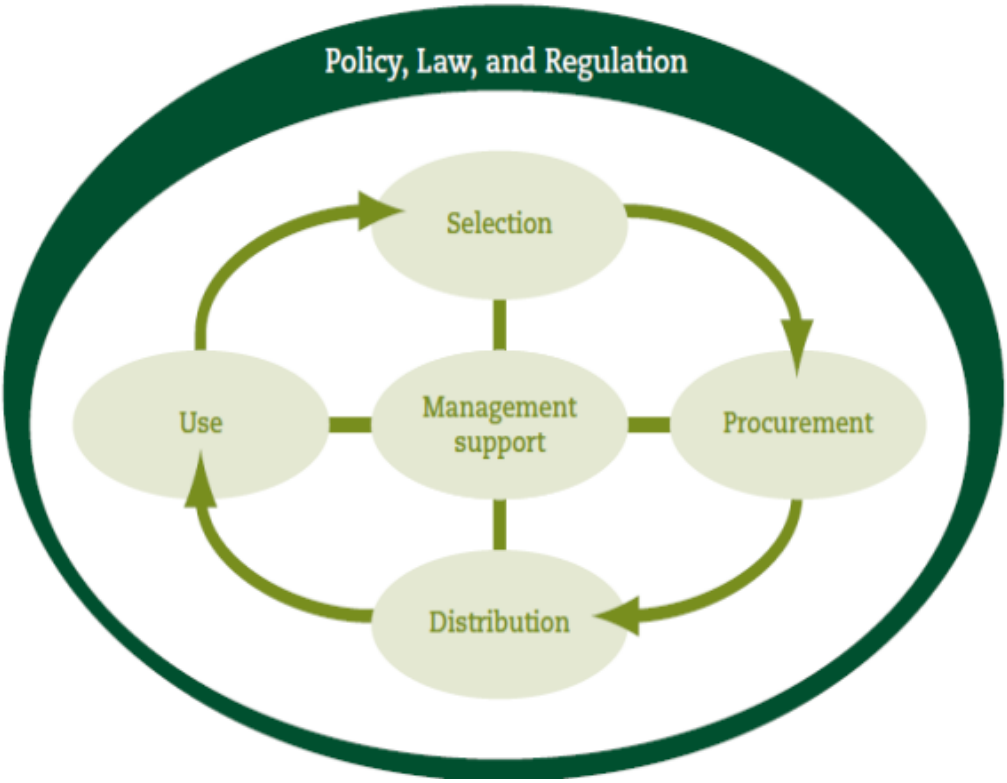


Figure-1: Drug supply management cycle

Now, let us look at each components of drug supply management:

1. **Drug Selection:** Is the process of determining which types of medicines should be used for what clinical indications. It is often done by a committee (Drugs and therapeutic committee) that includes clinicians, pharmacists, policy makers and others.

2.Procurement: - Is the process of buying the selected products in the determined quantities and quality—for delivery at the right time. It is often done through an international/national tender whichcontains, among many other things, the exact specifications and quantities desired and where and when the products are to be delivered. Procurement includes quantification and inventory managements.

Quantification: - Is the calculation of required quantities of medicines, tests or services essential to correctly treat patients for a certain period of time—usually one year for the national leveland one month to a quarter for the district and/or health center level.

InventoryManagement:- Are the processes involved in ensuring that adequate stocks of products are kept, quality maintained and that programmes and service delivery points have the products they needavailable and accessible where and when they need them.

3. **Distribution: -** Involves arrangements for the physical transport of products from central level tointermediary storage points to the final service delivery points. A particularly importantelement of this is Logistics Management Information System (LMIS, explained in unit 2) providing information of how much of each product is needed where and when.
4. **Rational Use: -** Refers to the monitoring of the dispensing of medicines and other products, and whether the dispensing complies with the STG on which Selection, Quantification and Procurement were done.

Activity-1:Be in one to five groups and discuss the following questions:

1. Define drug and give at least five examples of drug.
2. Why do we worry for drug management?
3. Discuss the four components of drug supply management cycle.

2. DRUG PROCUREMENT

Objective:

At the end of this unit, you will be able to

- List drugs selection criteria
- Describe pharmaceutical procurement cycles
- Describe pharmaceutical procurement methods
- Describe drugs purchasing models
- Perform stock control

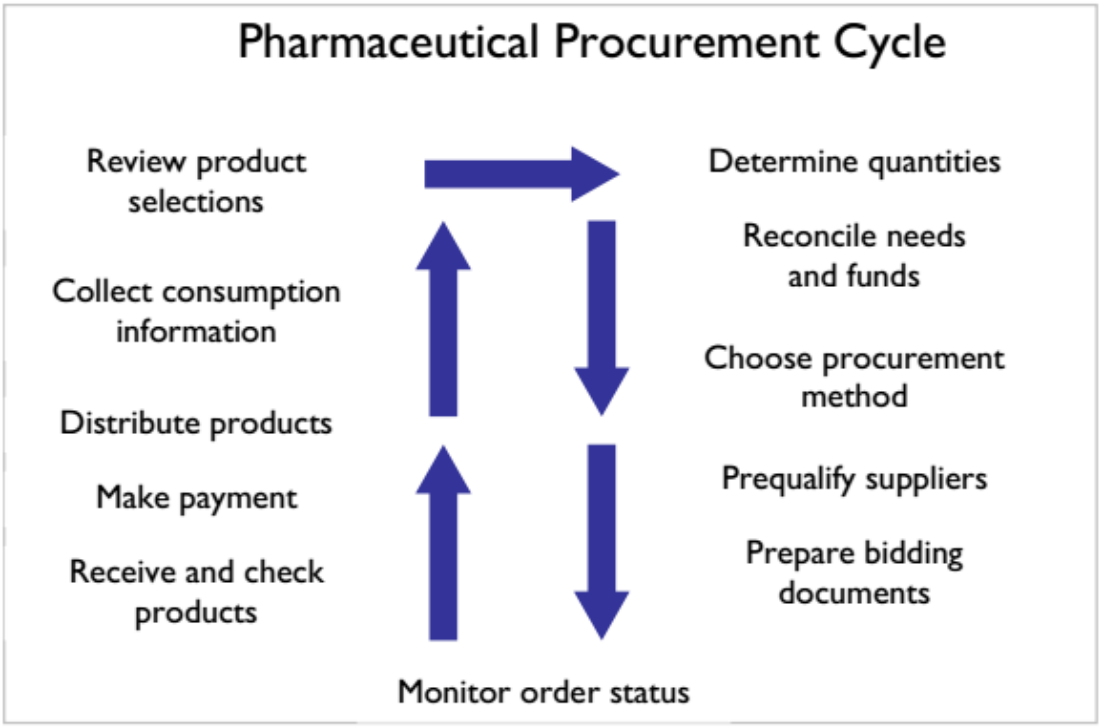
2.1 Introduction

The pharmaceutical procurement system is a major determinantof pharmaceutical availability and total pharmaceutical costs. In most developing countries, pharmaceutical purchases represent the single largest health expenditure after personnel costs. Pharmaceuticals also consume the major share of health-related foreign currency exchange.

As it was defined above, procurement is process of purchasing selected and quantified products/drugs for use.An effective procurement process ensures the availability of the right drugs in the right quantities, at reasonable prices and at recognized standards of quality, quality of drugs received.

2.2 The procurement cycle

The procurement cycle includes most of the decisions andactions that determine the specific medicine quantitiesobtained, prices paid, and quality of medicines received.Steps in the procurement cycle are illustrated in the figure 1 below.



Source: Management Sciences for Health

Figure 1: procurement cycle

Dear trainees, now let us discuss eachcomponent of drug procurement cycles in detail.

2.2.1 Review drug selection

Drug selection is a process of deciding the type of drug products needed for the prevalent diseases.Resources are limited and choices have to be made. A limited list of drugs for procurement, based on an essential drugs list or drug formulary, defines which drugs will be regularly purchased, is one of the most effective ways to control drug expenditure.

Drug procurement based on an essential drugs list or drug formulary allows the health system to concentrate resources on the most cost-effective and affordable drugs to treat prevailing health problems. The selection of drugs based on a national formulary or national list allows for concentrating on a limited number of products. Larger quantities may encourage competition and lead to more competitive drug prices. Reducing the number of items also simplifies other supply management activities and reduces inventory-carrying costs.

Activity: Be in a pair and answer the following questions:

1. What is essential drug list?
2. Does Ethiopia have its own essential drug lists?
3. What is drug formulary?

- Key Factors that should be considered in drug selection include:
  - Keeping costs of drugs and dosage forms affordable and cost-effective so as to optimize the use of financial resources;
  - Having drugs available for the treatment of most prevalent diseases, ailments, sicknesses and the levels of care provided;
  - Availability of safe, effective and good-quality drugs.
  - National health policy like program pharmaceuticals (free service, exempted services) and revolving drug fund (RDF) pharmaceuticals.
  - Locally manufactured drugs should have get priority.
  - Training and experience of available personnel

Generic name: - also known as International nonproprietary names (INNs) are normally used in identifying selected drugs.The generic name is used in writing prescriptions as well as in purchasing drugs. The use of the generic name for these purposes has certain advantages:

- There is easy recognition of the type of drug, especially where many selected drugs exist in that class (e.g. all benzodiazepines have INNs ending with "-zepam");
- Drugs can be purchased from multiple sources, thus giving the advantage of buying at a competitive price;
- Product substitution is easy where bio-availability presents a clinical problem;
- The confusion associated with the use of brand names can be avoided.

Brand name: - Proprietary medicines are medicines protected by a patent, which are sold under a tradename given by the manufacturer. A drug can have multiple trade name.

Table 1: - Example generic and brand names

Generic name	Brand name
Acetyl salicylic acid	Asprin®, Aspro®
Albendazole	Zentel®
Amoxcillin+Clavulinic acid	Augument®
Benzylpenicillin	Megacillin®, Specillin®
Cimetidine	Tagamet®
Cotrimoxazole (sulphametoxazole + trimethoprim)	Bactrim®, Septrim®
Dexamethasone	Dectancyl®, Dexone®
Diazepam	Valium®
Doxycycline	Doxigram®, Monocline®
Ibuprofen	Brufen®
Penytoin	Di-Hydan®, Dilantin®
Phenobarbital	Gardenal®
Propranolol	Inderal®
Salbutamol	Ventolin®
Paracetamol	Panadol®

2.2.2 Drug Quantification

Quantification: -is the process of determining/calculating the amount of drugs/ products needed.The management of the drug supply works best when products are available.Supplies are more likely to be available if ordered regularly. Supplies should be orderedbased on their use (consumption). If you order supplies based on consumption, you willhave the supplies you need when you need them.

Symptoms of poor quantification

- The most commonly encountered symptoms of poor quantification of drug requirements are:
  - Chronic and widespread shortages
  - Surpluses or overstock
  - Inadequate cost-effectiveness:- by failure to use cheaper but equally effective drugs or dosage forms is a widespread problem
  - Irrational adjustments to budgetary constraints: - may lead to irrational order quantities
  - Irrational and ineffective prescribing

There are four drug quantification methods. These are:

1. Consumption method
2. Morbidity method
3. Adjusted consumption method
4. Service level projection budget requirement

However, the first two are the most commonly used methods of drugs quantification in our country.

Consumption Method: uses records of past consumption of individual drugs.

Morbidity Method: estimates the need for specific drugs based on the expected number of attendance, the incidence of common diseases and the standard treatment patterns for the diseases considered. Each of the method has its own advantage and disadvantage as detailed in table 2 below:

Table 2: - Comparison of Quantification Methods

Method	Uses	Essential Date	Limitations
Consumption	First choice for procurement and future consumption forecasts	Reliable inventory records, Records of supplier lead time, Projected drug costs	Must have accurate consumption data can perpetuate irrational use
Morbidity	Estimating need in new programs or disaster assistance	Data on population and patient attendance; Actual or projected incidence of health problems; Standard treatment; Projected drug costs	Morbidity data not available for an diseases; Standard treatments may not really be used

Estimation of drug requirements

The estimate of the drug and medical supplies required for a given period is undertaken:

- To avoid shortages (out of stock) and ensure credible health care service,
- To prevent excess stock and avoid waste (loss or mismanagement of financial resources).

❖ Factors that influence choice and quantity of drugs include:

- Catchment population which the health institution serves,
- Disease pattern and seasonal variation in disease pattern,
- Monthly (rate of) drug consumption,
- Knowledge of quantity of each dosage form that is regularly consumed,
- Delivery (lead) time,
- Request indicator (re-order level):
- Quantity of drug product that serves as a signal for re-ordering.

The three factors—delivery (lead) time, monthly consumption and request indicator—are considered as the basis for calculating the appropriate quantity of a particular drug to be ordered. So let us look these three factors one by one.

Delivery (lead) time: - it is time lag between placing orders and receiving the orders. It is important to establish how long it takes to have a drug delivered and receipted in

the store so that the drug does not become out of stock. Delivery time may be days, weeks or even months due to the following factors:

- Poor road conditions, particularly in the rainy season,
- Poor condition of delivery vehicles,
- Increased work load at the issuing store (e.g. Pharmaceutical Fund and Supply Agency)
- Stock out of drugs at the central store (Pharmaceutical Fund and Supply Agency),
- Consumption rate of drugs at Health centers

Monthly consumption*:* - is obtained by calculating the average consumption over a period of time (e.g. six months)or dividing the total consumption over the period by the number of months the a drug was consumed. It is also known as average monthly consumptions (AMC).

Note: AMC= Total consumption/ Number of months

*According to Ethiopian Integrated Pharmaceutical logistics System(IPLS) 3months period is used to calculate average monthly consumption

Example 1:Average monthly consumption

- The first method of calculating monthly consumption ;is to add the quantity of drugs in stock at the beginning of a period (e.g., six months) to the quantity of drugs received during that same period and then subtract the quantity of drugs remaining at the end of the period look at the following transaction in X health center.
  - March 2017, quantity of paracetamol 1,000 x 500-mg tablet containers in stock = 14
  - June 2017, quantity of paracetamol 1,000 x 500-mg tablet containers received = 8
  - August 2017, quantity of paracetamol 1,000 x 500-mg tablet containers, remaining stock= 6

➔ Therefore, total quantity of paracetamol 1,000 x 500-mg tablet containers consumed over a six-month period = 14 + 8 – 6 = 16.

AMC= Total consumption/Number of months

AMC = 16/6

Average monthly consumption to the nearest container = 8/3

Example 2: Average monthly consumption

❖ A second method of calculating the average monthly consumption is to obtain data on consumption from the bin card on a monthly basis and then find an average over a period of time.

April 2000	2 x 1,000 tablets
May 2000	4 x 1,000 tablets
June 2000	2 x 1,000 tablets
July 2000	2 x 1,000 tablets
August 2000	3 x 1,000 tablets
September 2000	3 x 1,000 tablets
	16 x 1,000 tablets

Average monthly consumption is $\frac{16 \times 1{,}000 \text{ tablets}}{6} = 8/3$ containers

Average monthly consumption of container to the nearest container = 3

Example 3:Monthly consumption

A third method of calculating average monthly consumption is to obtain data on actual consumption from the daily use record or daily use/cash record.Data of monthly consumption of paracetamol 500-mg tablets over a six-month period.

April 2000	2,000 tablets
May 2000	3,100 tablets
June 2000	2,300 tablets
July 2000	2,100 tablets
August 2000	3,100 tablets
September 2000	3,200 tablets
Total six months	15,800 tablets

Average monthly consumption of tablet is $\frac{15,800}{6}$ = 2633.3 tablets

Each container has 1,000 tablets. Therefore the average monthly consumption of 1,000-tablet tin = $\frac{2633.3}{1000}$ = 2.6 tins

Average monthly consumption of paracetamol 500-mg tablets to the nearest container =3

Request indicator (re-order):- It is also known as **safety stock**. It is the level of drugs in stock; it indicates when fresh orders should be made. It is the quantity that is calculated to last between the period of placing the order and the delivery of the new consignment.

- The stock should never reach **"zero level"** before a request is made, as there will be a shortage of stock for some time.
- It is easy to calculate the RI once the monthly consumption is obtained.

For example:

If the delivery time is three months and the monthly total consumption is 2633.3

Then RI is: 2633.3 tablets x 3 months = 7,900 tablets

Since the unit of issue is tins of 1,000 tablets, the above figure must be brought to the nearest tin, which is 7,900 = 7.90 = approximately 8tins of 1000 tablets

- This means that when the stock of paracetamol is reduced to 8 tins, a new request must be made.

  = (2 tins x 3 months) + 2 tins

  = 8 tins

  (c.) RI = 6 tins; current stock balance = 0 tins

  In this case an extra quantity must be requested to cover the RI.

  Request quantity = 2 tins x 3 months + 1 month consumption (2 tins) + RI (6 tins) quantity

  = (2 x 3) + 2 + 6

  = 14 tins

In each case above, if previous data show that the number of patients would increase (e.g. malaria cases due to seasonal variations), then the quantities should be increased proportionally.

- If the number of patients is expected to double, then the quantity should be multiplied by 2.
- If the number of patients is expected to drop by half, then the quantity should be multiplied by $^{1}/_{2}$.

Exercise-1

The following information was extracted from the bin card for paracetamol tablets at the GudayaBila health center pharmacy. Paracetamol 500 mg tablets; tin or container or box 1, 000 tablets Monthly consumption for proceeding six months is as follows:

4/2017	6 x 1,000 tablets
5/2017	5 x 1,000 tablets
6/2017	4 x 1,000 tablets
7/2017	3 x 1,000 tablets
8/2017	7 x 1,000 tablets
9/2017	4 x 1,000 tablets

Calculate: The total consumptions of paracetamol tablet in boxes of 1000 tablets and average monthly consumption: Assume that a lead (delivery) time of 3 months. What is safety stock or reorder indicator. What is AMC according IPLS, which recommends using the last three consecutive months for AMC calculations?

Home take assignment -1

1. The following information was extracted from the bin card for Amoxicillin capsule at the GudayaBila health center pharmacy. Amoxicillin 500 mg capsule 50x10 box was consumed as follow:
   - 20 boxes in January, 2017
   - 30 boxes in February, 2017
   - 20 boxes in March, 2017

Then what is average monthly consumption of 500mg of Amoxicillinin both box and capsule? If lead time is two weeks, what is safety stock or request indicator?

2.2.3 Reconcile needs and funds

The need of drugs should be reconciled with funds allocated for drugs purchasing. This can be done by using:

VEN analysis:

- ❖ The VEN system sets priorities for drug selection and drug procurement according to the potential health impact of individual drugs.
- **V (vital)** – drugs, which have a potentially of life saving, are categorized as vital. This category of drugs should be available all the time in the health facilities.E.g. ORS, Vaccines, Antimalarias etc.
- **E (Essential**) – dugs, which are effective against less life threatening (common problems), are categorized as essentialE.g.Certain Antibiotics
- **N (Normal uses)** – drugs used for minor or self-limiting health problems. E.g. Cough syrup, antacid

ABC analysis:

- ❖ ABC analysis is an extremely powerful tool, with uses in selection, procurement, management of distribution, and promotion of rational drug use.

- Class A item (10 to 20% of items, 75 to 80% percent of expenditures are mostly high-volume, fast moving drugs.
- Class B item are usually 10 to 20% of items and 15 to 20% of expenditures
- Class C items often represent 60 to 80% of the items but only about 5 to 10% of expenditures, these are the low – volume, slow moving items. Thus, Class C is a good place to look for items that might not be needed in stock at all times.

2.2.4 Procurement methods and Purchasing models

There are four types of procurement methods used to purchase drugs. These are open tender, restricted tender, competitive negotiation & direct procurement. They vary with respect to their effect on price, delivery times, and work load of the procurement office.

The procurement method chosen should:

- Obtain the lowest possible purchase price for high quality products
- Ensure suppliers' reliability, in terms of both quality and service
- Maintain transparency in the process and minimize the opportunity for illicit influences on procurement decisions
- Achieve these objectives with the least possible professional and clerical staff time and within the shortest possible time.

Table3:- Advantages and disadvantages of procurement methods

Procurement method	**Advantages**	**Disadvantages**
Open tender	Many bids, some with low prices New supplies can be identified	High workload required in evaluating bids and selected suppliers
Restricted tender	Fewer bids, prequalified suppliers, Quality easier to ensure	Fewer bids, more limited options A system for prequalification of suppliers must be in place
Competitive negotiation	Suppliers generally well known, less evaluation work	Generally higher prices
Direct procurement	Easy and quick	High prices

- These methods are used combined with the standard purchasing models – annual, scheduled, or perpetual review – given the right sort of procurement contract.

The three purchasing models are described below:

Annual purchasing – Products/drugs are purchased once a year

- Main reasons to use annual purchasing are: -easier to manage and usually lower unit price when we purchase in bulk.
- It has the following disadvantages when used as a sole means of drug purchasing:
    - Consumption change—Shortage or surplus
    - High inventory holding cost
    - More space for storage if not spaced in delivery
    - May be difficult to cope up with funds at once

Scheduled purchasing - a periodic review model in which orders are placed at prescribed intervals. For example purchase from Pharmaceutical Fund and Supply Agency(PFSA)every two months.

Perpetual purchasing- Drugs are purchased when the stock reaches reorder quantity or safety stock.

2.2.5 Locate and select suppliers

The selection of suppliers has a profound impact on the quality and cost of drugs acquired. Inadequate safeguards in supplier selection may result in the purchase of drugs that are ineffective, unsafe or even deadly.

Hidden costs resulting from late deliveries, complete default on confirmed orders, losses due to poor packaging, or short expiry dates are common problems with unreliable suppliers that may raise the actual drug cost to several times the original contract cost.

Pre- and post-qualification procedures help to eliminate substandard suppliers, if properly managed.

Pre-qualification is the procedure of evaluating supplier capacity and reputation before bids are solicited for specific products.

Post-qualification evaluates the suppliers after bids have been received. If there are numerous offers from unknown suppliers there may be long delays in awarding contracts, as it will be necessary to validate suppliers' capacity to supply good-quality products.

➔ In addition to using pre- or post-qualification procedures, successful procurement offices ensure continued good supplier performance through a formal monitoring system which tracks:

- lead time
- compliance with contract terms
- partial shipments, quality of drugs
- remaining shelf-life
- Compliance with packaging and labeling instructions, etc.

❖ There are three ways of locating qualified suppliers:

1. **Direct inquiries**: Direct inquiries to suppliers are the quickest means of attracting an offer.
2. **Public Tender**: Can be publicized through local newspaper notices, international notices, and direct mailings to known suppliers to attract a large number of bidders.
3. **Contacts with International Agencies**: may be one of the most effective ways for a procurement office with little international experience to identify potential suppliers WHO, the World Bank, or the United Nations Children's Fund may be able to help establish communications with companies, trade associations, and procurement agencies.

2.2.6 Specify contract terms

A contract for provision of goods or services is a legally binding document between a purchaser and seller for a specified period of time.

Preparing an effective drug procurement contract is a specialized function requiring a great deal of care. Critical details include:-

- The specification of the drug
- The quality standards required
- The type of packing
- The price and payment terms and
- The last day of shipment

2.2.7 Monitor order status

The procurement office is responsible for monitoring performance and compliance with contract terms by the suppliers. The office must actively track suppliers' lead time, delivery status, compliance with contract pricing and terms, shelf life, and packaging of product

2.2.8 Receive and check drugs

Procurement proceduresshould include all assurances that the drugspurchased are of high quality, according to international standards.

Four components make up an effective quality assurance system:

- Selecting reliable suppliers of quality drugs;
- Using existing mechanisms, such as the WHO Certification Scheme on the

Quality of Pharmaceutical Products Moving in International Commerce;

- Establishing a programme of product defect reporting; and
- Performing targeted quality control testing.

The final steps in procurement cycle are make payment, distributing drugs, and collecting consumption information.

2.3 Key principles of good pharmaceutical Procurement

1. Procurement by generic Name: important for fair competition, specify quality standards,
2. Limitation of procurement by essential drug list, Formulary & treatment guidelines

   → Avoid generic (Brand) duplications

   → Select safe, effective, cost- effective drugs

3. Procurement in bulk
   - Concentrate purchases on limited list to increase quality, reduce price
   - Specify divided deliveries
4. Formal Suppliers Qualification & monitoring
   - Use formal suppliers qualification based on drug quality, service reliability
   - Approve suppliers before tendering (prequalification) or after (post qualification).
   - Use a formal monitoring system to ensure continued supplier qualification.
5. Sole- source commitment
   - All contracted drugs are procured from winning supplier.
   - Enter into no separate deals with non-contracted suppliers.
   - Adjust for expected program growth & changing disease pattern
6. Order quantities based on reliable Estimate at Actual need.
   - Develop reliable consumption records & morbidity data.
7. Reliable payment & Good financial management
   - Develop mechanisms for prompt, reliable payment
   - Prompt payment may bring down drugs prices as much as bulk discounts.
   - Financial mechanisms that establish separate drug accounts
8. Transparency & written procedure
   - Develop & follow written procedures for all procurement actions
9. Separation of key functions
   - Separate key functions that require different expertise
   - Functions that involve d/t committees, units, or individuals,
10. Product quality Assurance program
    - Establish & maintain a formal system for product quality assurance

- Include quality assurance product certification, inspection of shipments, targeted laboratory testing, and reporting of suspect products.

11. Annual Audit with published results
    - Conduct an annual audit to assess Compliance with procurement procedures, promptness of payment, & related factors.
12. Regular reporting procurement performance

Summary

In this unit, you have learned the following:

Drug management supply is an act to ensure the high quality essential drugs are available, affordable, and used rationally

Drug management functions are undertaken in four principal phases, which are interlinked and are reinforced by appropriate management support systems.

- Drug Selection: Is the process of determining which types of medicines should be used for what clinical indications
- Procurement: - Is the process of buying the selected products in the determined quantities and quality—for delivery at the right time.
- Distribution: - Involves arrangements for the physical transport of products from central level to intermediary storage points to the final service delivery points.
- Rational Use: - Refers to the monitoring of the dispensing of medicines and other products
  - Drugs procurement cycles
  - Generic name: - also known as International nonproprietary names (INNs) are normally used in identifying selected drugs.
  - Brand name: - Proprietary medicines are medicines protected by a patent, which are sold under a trade name given by the manufacturer.
  - Quantification: - is the process of determining/calculating the amount of drugs/ products needed.

Symptoms of poor quantification

- Chronic and widespread shortages
- Surpluses or overstock
- Inadequate cost-effectiveness:- by failure to use cheaper but equally effective drugs or dosage forms is a widespread problem
- Irrational adjustments to budgetary constraints: - may lead to irrational order quantities
- Irrational and ineffective prescribing

- Delivery (lead) time: - it is time lag between placing orders and receiving the orders.
- AMC= Total consumption/ Number of months
- VEN and ABC analysis:
- There are four methods of drug procurement:
    - Open tender,
    - Restricted tender,
    - Competitive negotiation &
    - Direct procurement.
- Drugs purchasing models:
    - Annual purchasing
    - Scheduled purchasing
    - Perpetual purchasing
- Key principles of good pharmaceutical purchasing

Self-check

Part I: True or False

1. Medicines are backbone of health care system so that they need special management(True/False).
2. Procurement is the process of buying the selected products in the determined quantities and quality—for delivery at the right time(True/False).
3. Quantification is process of determining amount of products needed (True/False).
4. Generic name is the same as international nonproprietary names (INNs) (True/False).
5. Drugs purchasing should be done by using brand names(True/False).
6. Request indicator (re-order) is also known as safety stock, used as an alarming indication for re-order (True/False).
7. ABC analysis is an extremely powerful tool, with uses in selection, procurement, management of distribution, and promotion of rational drug use(True/False).
8. Orders are placed whenever stock falls to specific level in scheduled purchasing(True/False).
9. The simplest and most practical period for which to calculate average monthly consumption is three months (True/False).
10. Selection of combination of drug products has advantages over single compounds(True/False).

Part II: Multiple Choose Questions:

1. All are phases of drug supply management except:
   A. Drug selection
   B. Drug Quantification
   C. Drug Procurement
   D. Drug use
2. Drugs which have a potentially of life saving, are categorized as:
   A. Vital
   B. Essential
   C. Normal
3. Which statement is true about procurement methods? (multiple answer is possible)
   A. In Open tenders, prices are usually highest
   B. In restricted tender, the lead time is shortest
   C. In competitive negotiation, the work load is high
   D. In direct procurement, prices are usually highest
   E. All are true
4. Good pharmaceutical procurement practices include all except:
   A. Procure by generic name.
   B. Procure from winning suppliers.
   C. Procure in bulk.
   D. Order quantities arbitrarily.
   E. All
5. Which statement is true about annual purchasing model?
   A. Less storage space is needed.
   B. Less inventory holding cost.
   C. Make better use of limited drug budget
   D. Drug purchase prices per unit are usually lower.

Part III: Short answer questions

1. Lists symptoms of poor quantification of drug
2. What is the difference between RDF and Program pharmaceuticals?
3. Discuss procurement cycles.

3. ORDERING AND RECEIVING OF PHARMACEUTICALS

Objective:

At the end of this unit, you will be able to

- To identify different stock requisition and receiving formats
- Use IFRR to request stock for dispensary
- To identify stock receiving steps
- To enter dispensary stock in to stock records (bin card)

3.1 Introduction

Logistics management information system (LMIS) is the system of records and reports that you use to collect, organize, and present logistics data gathered across all levels of the system. Most importantly, LMIS enables you to collect the data needed to make informed decisions that will ultimately improve customer services.

Activity: What are the three essential logistics data and three logistics data records?

The three essential data items those are required to run a logistics system andmust be captured by the LMIS are:

1. **Stock on Hand:** Quantities of usable stock available at a particular point in time.
2. **Consumption Data:** The quantity of pharmaceuticals used during the reporting period.
3. **Losses/Adjustments:** Losses are the quantities of products removed from your stock for anything other than in the provision of services to patients or issuing to another facility (e.g. expiry, lost, theft, or damage) and are recorded as negative (-) numbers. Adjustments are quantities of a product received from any source other than PFSA, or issued to anyone other than your health facility. An adjustment may also be a correction due to an error in mathematics. An adjustment may be a negative (-) or positive (+) number.

From a logistics point of view, only three things can happen to supplies/pharmaceuticals in a pipeline—they can be stored, moved (in transit), or consumed (used).

- Stock keeping records. Holds information about products in storage. E.g. Bin cards, Stock cards, inventory control cards..
- Transaction records. Holds information about products being moved. E.g. Internal Facility Report and Requisition Form(IFRR), Report and Resupply Form (RRF)
- Consumption records. Holds information about products being consumed or used.E.g. Daily dispensing registry(DDR)

Therefore, a well-designed logistics management information system will include records and forms that collect and report the three essential data items as they relate to these three activities.

To prevent stock out of pharmaceuticals or drugs in the health the drug should be timely ordered and received. In our country, Ethiopia, different formats are being in use for the supply/order and receiving within facilities and outside facilities from pharmaceutical fund and supply agency. In thisunit, you will see different formats used in the health facility.

3.2 Drugs orderingwithin facility

Drugs that are ordered for use in the health institutions must be approved for use in that institution. The drugs should also be relevant to the pattern of endemic diseases as well as the type of services being provided.

It is advisable to request drugs on a regular basis to prevent shortages. If drugs are not always available, patients may lose confidence in the health service being given and will be discouraged from visiting it. It is important to make requests on a regular basis, as drugs will only be delivered when requested. The delivery time should be taken into consideration in ensuring that drugs are not in short supply.The head of the health center and a representative of the health committee should endorse the stores requisition/delivery (issue) form.

When issuing pharmaceuticals to a unit within a health Centre or hospital, the Internal Facility Report and Resupply Form (IFRR) is used to maintain a record of the products thatare issued and received. The Internal Facility Report and Resupply Form(see Annex-1)should bekept in the respective dispensing units and completed when a service provider is scheduledto come for re-supply.

Note the following while receiving:

- The consignment must come with two copies of the stores internal facility report and requisition forms (IFRR)
- Check that the quantity issued actually corresponds to the quantity indicated on IFRR
- Check off each drug after checking.
- Take note of the unit price of each drug and compare it to the previous unit price.
- Check that all original boxes, tins or bottles are unopened and are in good condition.
- Check the labels and ensure that there are no expired drugs being received.
- Any drugs already expired or soon to expire that cannot be consumed before expiration ordrugs not in good condition should be returned for destruction or redistribution to othercenters.
- Sign two copies of the stores IFRR if the above procedure has been completed.
- Return one copy of the signed stores requisition/delivery (issue) form to the medical stores, and place another copy in the “drug order” file.
- Place drugs with shorter expiration dates in front of the shelf so that they can be reached and used first.
- Remember to record the new stock on the respective stock (bin) cards and appropriate forms.

Assignment: Write information/data that should be entered into IFRR while filling?

3.3 Receipt of drugs at dispensary

Note the following points while receiving drugs at dispensary:

- Check that the quantity issued actually corresponds to the quantity indicated on the stores requisition/delivery (issue) form.
- Check off each drug after checking.
- Take note of the unit price of each drug and compare it to the previous unit price.
- Check that all original boxes, tins or bottles are unopened and are in good condition.
- Check the labels and ensure that there are no expired drugs being received.
- Any drugs already expired or soon to expire that cannot be consumed before expiration or drugs not in good condition should be returned for destruction or redistribution to other centers.
- Return one copy of the signed stores requisition/delivery (issue) form to the medical stores, and place another copy in the "drug order" file.
- Place drugs with shorter expiration dates in front of the shelf so that they can be reached and used first.

3.3.1 Discrepancies when receiving drugs

- Where there is a difference in the quantities of drugs issued and the quantities actually received, request the delivery team to give an immediate explanation and make the necessary correction on the stores requisition/delivery (issue) form. If there are broken bottles or leaking packages, hand these over to the delivery team along with an internal drug return (IDR) form.
- Discrepancies should always be recorded in the Remarks column on the stores requisition/delivery (issue) form.

Transfer voucher or internal drug return (IDR) form

The transfer voucher effects the movement of the following items to the medical store:

- ✓ Expiring drugs, Damaged or spoiled drugs,
- ✓ Drugs soon to expire,
- ✓ Excess stock resulting from wrong RI or low consumption.

The following rules should be kept in mind:

- It is important that drugs are not allowed to expire in the health center because of changes in disease pattern or for any other reasons.
- Items that can be used elsewhere should be transferred immediately using an IDR form to the medical stores for subsequent redistribution.
- Expired or spoiled items should be transferred immediately using the IDR form to the medical stores for destruction.

Table 4: Example of Transfer Voucher or Internal Drug Return Form

Item description issue	Unit of issue	Expiry date	Quantity	Unit price	Amount	Remarks
Normal saline 500 ml	500 ml	9/04	10	800	8,000	Leaking
Aspirin 500 mg	1,000 tab	7/04	2,000	10	20,000	Soon to expire
Bipenicillin 1 MU	1 vial	4/04	2	180	360	Broken
Mebendazole 100 mg	1,000 tab	6/04	610	30	18,300	Expired
Chloroquine 100mg	1,000 tab	1/04	3,000	10	30,000	Over quantity
ANC card	Piece	-	5	150	750	Misprint
Povidone iodine	100 ml	12/04	2	1,000	2,000	*Not supplied*
				TOTAL	**79,410**	

3.3.2 Product recall

Recall means firm's removal of marketed pharmaceutical product that EFMHACA considersbeing unsafe,inefficacious and poor quality. Recall doesn't not include market withdrawal or returnedproducts.

Steps of Recall Procedure

The procedure is divided into six steps, which are set out below

1. Receipt of Pharmaceutical Product Problem Report
   - Notification to EFMHACA
2. Initiation of Recall and Information required for Assessment
3. Assessment of Recall. The classification, level and strategy of recall are determined depending on the potential hazardof the defective product and the extent of product distribution.
4. Communication
   Letters and press release (if required) are dispatched to relevant firms for notifying on the recall.
5. Progress of Recall and Report
   Progress reports and a final report are submitted EFMHACA.
6. Evaluation of the Recall
   The effectiveness of the recall is monitored by EFMHACA

3.4 Reporting and requesting from PFSA

A stores requisition/delivery (issue) form should accompany any supply made from the PFSA. Health centers normally receive their drug supplies from central, regional PFSA. In some cases they may purchase drugs from other sources private sources.

- Supplies are issued on the basis of request made to the PFSA by the health centreon an approved stores requisition report and requisition form (RRF)(see Annex-2).
- The request should not be excessive and should preferably ask for quantities that can be used in between delivery times.
- The quantity of drugs requested is made in the appropriate column of the form and is sent to the medical store from which drugs are supplied.
- The request is made on the basis of approved delivery time, time frame or in emergency.
- The quantities of drugs delivered or issued from the medical stores should be entered in the appropriate column of the form.

- The records of requisition and receipt of drugs from the medical store are kept in the health centre in an approved manner.
- The delivery note from the PFSA should indicate what has been supplied as indicated in the stores RRF.
- RRF has the column for both requested and reported drugs see the RRF table below.
- RRF mostly used for program pharmaceuticals, which are given to the patients free of charges. E.g. Anti-malaria drugs, TB, ART drugs…

The RRF has 3 copies. Copies are distributed and kept during the process as follows:

* Hospital or Health Centre completes 3 copies of the RRF
* Sends 1 copy to PFSA
* Sends 1 copy to administrative body (RHB/ZHD or WoHO)
* Keep one copy with them

Guided practice:

Observation and practice how to fill RRF& IFRR at a health facility. Course instructor will provide sample of drug requisition and receiving form from the health care facility.

Summary

In this chapter you have learned:

LMIS is the system of records and reports that you use to collect, organize, and present logistics data gathered across all levels of the system.

Three essential data items are required to run a logistics system are:

- Stock on Hand: Quantities of usable stock available at a particular point in time.
- Consumption Data: The quantity of pharmaceuticals used during the reporting period.
- Losses/Adjustments**:**

The three basic stock records in drug supply management are:

- Stock keeping records. Holds information about products in storage. E.g. Bin cards, Stock cards, inventory control cards.
- Transaction records. Holds information about products being moved. E.g. Internal Facility Report and Requisition Form(IFRR), Report and Resupply Form (RRF)
- Consumption records. Holds information about products being consumed or used. E.g. Daily dispensing registry(DDR)
    - Reporting and requesting from pharmaceutical fund and supply agency
    - RRF used for requesting and reporting pharmaceuticals from PFSA
    - The RRF filled in 3 copies.
    - IFRR is use for requesting and reporting of pharmaceuticals from store to different service delivery points within health care facilities
    - Procedures of receiving drugs at dispensary

Self-check

Part I: True/False

1. LMIS enables you to collect the data needed to make informed decisions that will ultimately improve customer services (True/False).
2. Losses are the quantities of products removed from your stockfor anything other than in the provision of services to patients or issuing to anotherfacility (True/False).
3. The RRF should be filled by 3 copies (True/False).
4. IFRR should be filled by two copies (True/False).

Part II: Multiple choice questions

5. Stock keeping records includes:
   - A. Bin cards
   - B. Stock cards,
   - C. Inventory control cards.
   - D. All
6. Transaction records include:
   - A. IFRR
   - B. RRF
   - C. IRV
   - D. All
7. Consumption records.
   - A. Holds information about products being consumed or used.
   - B. Holds information about products in storage
   - C. Holds information about products being moved
   - D. None

4. DISPENSARY STOCK CONTROL

Objective:

At the end of this chapter you will be able to:

- To identify dispensary stock records and documentation
- To identify dispensary stock levels (min-max stock levels) and
- To investigate dispensary stock discrepancies
- To identify procedures and formats used for product recall and return forms

4.1 Introduction

Dispensary is a service delivery point, where pharmaceuticals or drugs are dispensed to patients. Within a health facility it could be out patient pharmacy, wards, MCH unit, ART clinic laboratory units. For all these services delivery points, drugs are obtained from the central pharmacy store of the facility. They should be managed properly in order to minimize pharmaceutical wastes through loses, thus there should be strong inventory control systems in the health care facilities.

The purpose of an inventory control system is to inform personnel when and how much of a pharmaceuticals to order and to maintain an appropriate stock level to meet the needs of patients.

- A well designed and well operated inventory control system helps to prevent shortages, oversupply, and expiry of pharmaceuticals.

To help maintain adequate stock levels, the maximum months of stock, minimum months of stock and an emergency order point have been established for each health facility in the system.

- **The maximum months of stock** is the largest amount of each pharmaceutical a facility should hold at any one time. If a facility has more than the maximum, it is overstocked and risks having stocks expire before they are used.
- **The minimum months of stock** is the level of stock at which actions to replenish inventory should occur under normal conditions.
- **The emergency order point** is the level where the risk of stocking out is likely, and an emergency order should be placed immediately.
  - In current Ethiopian integrated pharmaceutical logistics systems (IPLS) all facilities are required to report on a fixed schedule

- Health centers and hospitals are required to report and order every two months to PFSA
- Health centers and hospitals calculate their own order quantities, ordering sufficientquantities of all pharmaceuticals to bring stock levels up to the maximum level.
- Health posts report data monthly to their affiliated Health Centre
- Health center calculates the re-supply quantities that are needed to bring health poststocks up to the maximum level.
- If the stock on hand for any product at a facility falls below a set emergency order pointbefore the end of the reporting period, an emergency order should be placed.

4.2 Bin card

Bin card is one of the commonly used stock records keeping records are used in the dispensary:

The Bin Card is used at all health facilities (Health Post, Health Centre and Hospital); It services as body guard for a drug. It means that holds information about drugs quantity and expiry date, where there a drug there is bin card.

- Bin Cards are used to account for products held in storage, including their receipt and issue.
- In the IPLS valuable information used to make re-supply decisions is recorded on the Bin Card and Stock Record Card; data from these records are used in reporting, calculating reorder quantities and for monitoring stock levels.
- It is essential that personnel responsible for the storage of pharmaceuticals maintain up-to-date and accurate **Bin Cards.**
- One Bin Card should be maintained for each pack size, form or presentation of pharmaceuticals.
- The Bin Card should be kept with the product in the storage area.

Bin card is a body guard of a drug. It holds information about drugs quantity (transaction) and expiry date.

4.2.1 Recording Transactions in the Bin Card

Sample of Bin Card

Name of Health Facility: - _____
Product Name, Strength and Dosage Form: - _____
Unit of Issue: - _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/ Adj.	Balance			

Completed by: Health staff in charge of pharmaceuticals (Health Extension Worker, Pharmacy Store manager and Dispensing Units like wards heads, laboratory head…)

Purpose:

- To record pharmaceuticals received
- To record pharmaceuticals issued
- To record changes in stock balances
- To track supplies moved through non-routine methods (e.g., local purchase, transfers)
- To track losses/adjustments
- To record expiry dates

When to Perform:

- When pharmaceuticals are received or issued

- When pharmaceuticals are transferred to another facility
- When pharmaceuticals are transferred in from another facility
- When pharmaceuticals are removed from the storage area for reasons other than for use in health services (e.g., for demonstrations, expiration, damage)
- At the end of the month when physical counts are conducted at the Health Post; every other month at the Health Centers and Hospitals

Steps in Recording Transactions in the Bin Card

1. Complete one *Bin Card* for each pharmaceutical you manage

For example, each of the following should have a separate *Bin Card*:

Amoxicillin 250 mg capsule

Amoxicillin 500 mg capsule

2. Enter only one transaction on each line.
If Opening a new *Bin Card*, then continue with Step 3
If entering a transaction, then Skip to Step 10

Steps 3 – 10: Opening a new Bin Card

3. Name of Health Facility: Write the name of the health facility where the product is being managed.

4. Product Name, Strength and Dosage Form: Enter the name, pack size, form or presentation of the pharmaceutical.
Example: Acetaminophen 500 mg Tabs
Doxycycline 100 mg capsules

5. Unit of Issue: Write the individual unit for the particular pharmaceuticals.
Example: bottle, tablet, tube, piece

N.B: The unit recorded at the top of the *Bin Card* is the same unit that is used to record transactions on the card

6. Maximum Stock Level:

- For health centers and hospitals, the maximum has been set at 4 months of stock.

- For Health Post: 2 months of stock

7. **Emergency Order Point:**
   - For health centers and hospitals, the Emergency Order Point has been set at 0.5 months (= 2 weeks of stock).
   - For Health Post: 0.25 months of stock (=1week of stock)
8. **Average Monthly Consumption (AMC):** Take 3 months average of monthly Internal Issues from the Bin Card.
9. **Record the opening balance at the time the Bin Card is opened.**
   - If this is the first line of a new Bin Card for an existing product, write the date, write "Balance Brought Forward" under the received column, and record the ending balance from the old Bin Card under the balance column.
   - If this is the first line of a new Bin Card for a new product, conduct a physical count and record the results of the physical inventory on the first line of the Bin Card.

   If you do not have a transaction to record, you are finished with this part of the task. If you have a transaction to record, continue with Step 11 below.
10. **Date:** Enter the date of the transaction
11. **Document No. (Receiving or Issuing):** Write the pre-printed number from the issue or receipt voucher that was used to document the receipt or issue of the pharmaceuticals.
    Example: 736529
12. **Received From or Issued To:**
    - If receiving products, enter the name of the facility from which the item was received.
    - If issuing at a health post, write "dispensed to patients".
    - If issuing within a health center or hospital, or if issuing from a health center to a health post, write the name of the dispensing unit or health post to which the pharmaceuticals are being issued.
    - If a physical count was conducted, write "Physical Count".
    - If a positive adjustment (such as a transfer in) is being recorded, note from what facility products are being received.

13. **Quantity/Received:** Enter the exact amount of the product received on the date recorded.

- The quantity should be written in terms of units of issue, the units noted at the top of the card, for example, bottles.
- Stock transferred from one facility to another should be recorded as an adjustment (see Step 16 for information on entering adjustments). Therefore, the only quantities entered in the Quantity/Received column should be those quantities received from the health center (at the health post) or from PFSA (at the health center or hospital).

14. **Quantity/Issued:** Record the number of units issued as indicated: At the health post, write the total quantity of the product that was given to clients during the day. At the health center and hospital, write the quantity of the product each time the product is issued to dispensing unit and health post.
15. **Quantity/Loss/Adj.:** Enter the exact amount of losses or adjustments to the inventory on this date. Explain any losses or adjustments in the "Remarks" column (see Step 20).
    - **Losses** are quantities removed from your stock for anything other than issuing to patients or another unit in the facility (e.g. expired, lost, stolen, or damaged). Losses are recorded as (-) negative numbers.
    - **Adjustments** are quantities of a pharmaceuticals received from any source other than the regular source, that is, health center (for health posts) or PFSA (for health centers and hospitals), or issued to anyone other than within your facility.

Always use a (+) sign to indicate positive adjustments, and a (-) sign to indicate negative adjustments. Adjustments may also be made to correct mathematical mistakes previously made in recording. Be sure to indicate if the adjustment was negative or positive and note the reason for the adjustment in the "Remarks" column

16. **Quantity/Balance:**
    - If receiving products: Add the "Quantity Received" to the Balance from the previous row and then enter the new balance.
    - If issuing products: Subtract the "Quantity Issued" from the Balance from the previous row and then enter the new balance.
    - If recording a loss or adjustment: Add (if +ve adjustment) or subtract (if –ve adjustment) the loss or adjustment quantity to the Balance from the previous row and then enter the new Balance.

The Balance should show only the quantities of usable stock. Any unusable stock should have been removed from inventory and an adjustment made on the Bin Card.

17. Batch Number:

- At the health post: Leave this column blank.
- At the health center or hospital: Write the batch number of the pharmaceuticals received or issued.
- If the pharmaceuticals received or issued have more than one batch number, use a separate row for each batch number and indicate the quantity received or issued for each batch number.

18. Expiry Date:

- At the health post: Leave this column blank.
- At the health center or hospital: Write the expiry date of the pharmaceuticals received or issued.
- If the pharmaceuticals received or issued have more than one expiry date, use a separate row for each expiry date and indicate the quantity received or issued for each expiry date. Each expiry date should match with the corresponding batch number.

19. Remarks: Provide a brief explanation for any loss/adjustment or add any other comments as needed

Examples: Damaged product

Purchase from local pharmacy

Correction of math error

20. If you have filled the last line of the front of the Bin Card…. Turn to the back of the card and write "Balance Brought Forward" in the "Received From" column and carry the balance from the front of the card and write it in the "Balance" column of the back of the card.

If you have filled the last line of the back of the Bin Card…You will need to start a new Bin Card. Go to Step 3.

21. Keep the *Bin Card* close to where pharmaceuticals are being stored and issued.

The task is complete when:

- A separate *Bin Card* has been completed for each pharmaceuticals managed in the store.

- The Name of Health Facility, Product Name, Strength and Dosage Form, and Unit ofIssues have been written at the top of the *Bin Card*.
- Each transaction is recorded on the *Bin Card* as it occurs.
- The *Bin Card* is kept close to where the pharmaceuticals are stored and issued.

Bin Card

Name of the Health Facility: Sabian Health Center ,Family Planning Unit

Product Name, Strength and Dosage Form Condom

Unit of Issue: Pieces

Maximum Stock Level: _____ **Emergency Order Point:** _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/Adj	Balance			
Tikimt 1, 2003						420			
Tikimt 1, 2003			300			720			
Tikimt 1, 2002				120		600			
Tikimt 2, 2003				140		460			
Tikimt 2, 2003					-20	440			Expired
Tikimt 3, 2003				100		340			
Tikimt 4, 2003				100		240			
Tikimt 5, 2003				140		120			
Tikimt 5, 2003	Physical Count					120			

Bin Card

Name of the Health Facility: Sabian Health Center ,Family Planning Unit

Product Name, Strength and Dosage Form Depo Provera

Unit of Issue: Vial

Maximum Stock Level: _____ **Emergency Order Point:** _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/Adj	Balance			
Tikimt 1 2003						65			
Tikimt 1 2003			40			105			
Tikimt 1 2003				15		90			
Tikimt 2, 2003				19		71			
Tikimt 3, 2003				20		51			
Tikimt 4, 2003				19		32			
Tikimt 5, 2003				12		20			
Tikimt 5, 2003	Physical count					20			

Bin card

Name of the Health Facility: Sabian Health Center ,Family Planning Unit

Product Name, Strength and Dosage Form Microgynon

Unit of Issue: Cycle

Maximum Stock Level: _____ **Emergency Order Point:** _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/Adj	Balance			
Tikimt 1 2003						44			
Tikimt 1 2003			20			64			
Tikimt 1 2003				8		56			
Tikimt 2, 2003				10		46			
Tikimt 3, 2003				9		37			
Tikimt 4, 2003				12		25			
Tikimt 5, 2003				7		18			
Tikimt 5, 2003	Physical Count					18			

Bin Card

Name of the Health Facility: Sabian Health Center ,Family Planning Unit

Product Name, Strength and Dosage Form IUCD

Unit of Issue: Piece

Maximum Stock Level: _____ **Emergency Order Point:** _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/Adj	Balance			
Tikimt 1 2003						16			
Tikimt 1 2003			10			26			
Tikimt 2, 2003				6		20			
Tikimt 3, 2003				7		13			
Tikimt 4, 2003				5		8			
Tikimt 5, 2003				4		4			
Tikimt 5, 2003	Physical Count					4			

Bin card

Name of the Health Facility: Sabian Health Center ,Family Planning Unit

Product Name, Strength and Dosage Form Jadelle

Unit of Issue: Set

Maximum Stock Level: _____ **Emergency Order Point:** _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/Adj	Balance			
Tikimt 1 2003						4			
Tikimt 1 2003			2			6			
Tikimt 2, 2003				2		4			
Tikimt 3, 2003				2		2			
Tikimt 3, 2003					2	4			Found in the cabinet
Tikimt 4, 2003				1		3			
Tikimt 5, 2003				1		2			
Tikimt 5, 2003	Physical Count					2			

Casescenario-1

Instruction: - Fill in the Bin Card with the following information:

- The Bin Card is being used at GudayaBila Health Center.
- Bin Card for ciprofloxacin 500 mg tablets
- The Bin Card is started on 2 Ebla 2007.
- The unit of issue is boxes.
- The last balance from the previous Bin Card is 1000 boxes, which have a batch number of0712309 and an expiry date of July 7/2018.
- 2 Ebla 2007 Issued 50 boxes to the dispensary with a batch number of 0712309 and an expiration date of 7/2018
- 15 Ebla 2007 Received 1000 boxes from PFSA with a batch number of 1012409 and an expiration date of 10/2018.
- 18 Ebla 2007 transferred 400 boxes to ArjoGudetu health center with a batch number of 1012409 and an expiration date of 10/2018.
- 22 Ebla 2007 Issued 170 boxes to the dispensary with a batch number of 0712309 and an expiration date of 7/2018.
- 28 Ebla 2007, Stock assessment indicated 110 boxes to be damaged with a batch number of 1012409 and an expiration date of 10/2018 and were declared unusable

Summary

In this unit, you have learned

- **The maximum months of stock** is the largest amount of each pharmaceutical a facility should hold at any one time.
- **The minimum months of stock** is the level of stock at which actions to replenish inventory should occur under normal conditions.
- **The emergency order point** is the level where the risk of stocking out is likely, and an emergency order should be placed immediately.

➢ Bin card is one of the commonly used stock records keeping records are used in the dispensary:

➢ Components of bin card that should be filled and updated:

- Name of Health Facility
- Product Name, Strength and Dosage Form
- Unit of Issue
- Maximum Stock Level
- Emergency Order Point
- Average Monthly Consumption (AMC)
- Date
- Document No. (Receiving or Issuing)
- Received From or Issued To
- Quantity/Received
- Quantity/Issued
- Quantity/Loss/Adjustment
- Quantity/Balance
- Batch Number
- Expiry Date
- Remarks

Self-check

1. Enter the following transactions on the bin card and calculate average monthly consumption of niverapine.

- In January 2017, GudayaBila received from the PFSA of Nekemte branch 60 tins of a new item in the store called Niverapine 60 mg tablets with invoice number of 005867.
- During January, two tins of 500 tablets were issued to the dispensing area (ART pharmacy).
- In February, five tins were issued to ART pharmacy, and
- In the next two successive months, six and seven tins were issued to ART pharmacy respectively.
- Finally during the last four months, six, eight, nine and ten tins were issued to ART pharmacy, respectively.

Bin Card

Name of Health Facility: - _____
Product Name, Strength and Dosage Form: - _____
Unit of Issue: - _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/Adj.	Balance			

5. PHARMACEUTICAL STORE MANAGEMENT

Objective:

At the end of this chapter you will be able to:

- Recognize the essential elements of current good storage practices
- Identify storage conditions
- Use Standard operating procedures (SOPs) for pharmaceuticals storage
- Arrange and handlemedicines, vaccines and biological products in refrigerator

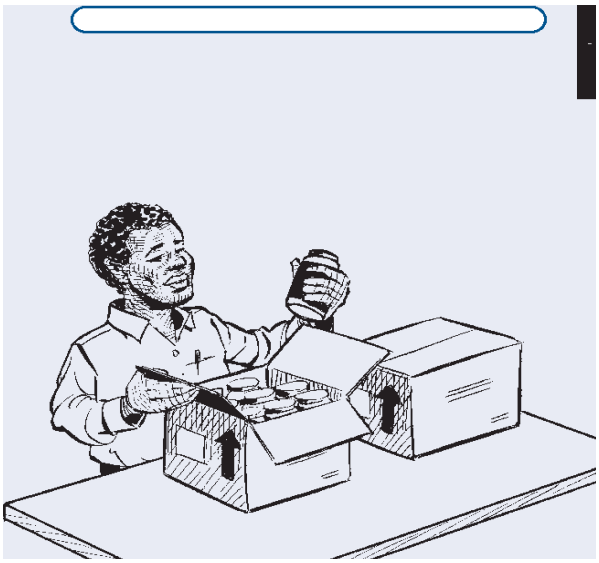
5.1 Introduction to pharmaceutical store management

Pharmaceuticals/drugs are stored at every facility in the pipeline of pharmaceuticals supply chain management; almost everyone working in the supply chain is responsible for product storage. Storage ensures the physical integrity and safety of products and their packaging,throughout the various storage facilities, until they are dispensed to clients. An important goal in storageof health products is the correct staging of health products to ensure that orders can be filled and distributed.

Regardless of storage facility size—from a small health center to a central warehouse—the main operational activities for storage are very similar. How complex these activities become will vary based on the volume of products to be managed and storage facility size; as well as particular requirements, such as cold storage.

- Drugs need to be stored in a specially designed secure area or space of a building in order to:
  - Avoid contamination or deterioration,
  - Avoid disfiguration of labels,
  - Maintain integrity of packaging and so guarantee quality and potency of drugs during shelf life,
  - Prevent or reduce pilferage, theft or losses,
  - Prevent infestation of pests.

5.2 Receiving Pharmaceuticals at Store



When you receive Drugs or other pharmaceuticals: -

1. Ensure there is sufficient storage space.
2. Prepare and clean the areas used for receiving and storing the products.
3. Inspect packages for damaged or expired

If products are damaged or expired, then

1. Separate the damaged or expired stock from the us
2. If damage or expiry is discovered while the deliv refuse to accept the products and note the problem(s) on the delivery note.
3. If damage or expiry is discovered after the delivery truck has departed, follow your facility's procedures for handling damaged or expired stock

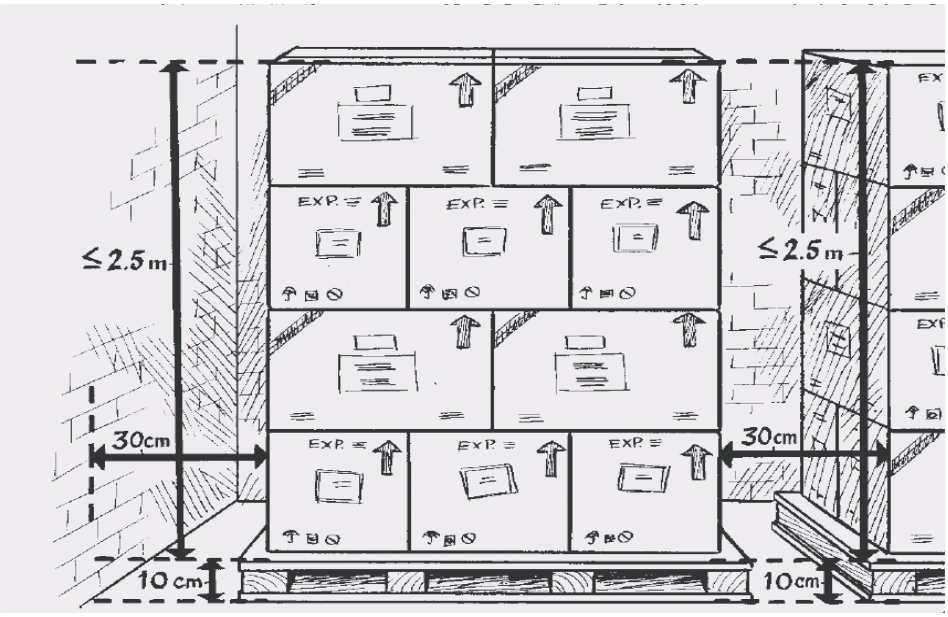
If products are not damaged or expired, then

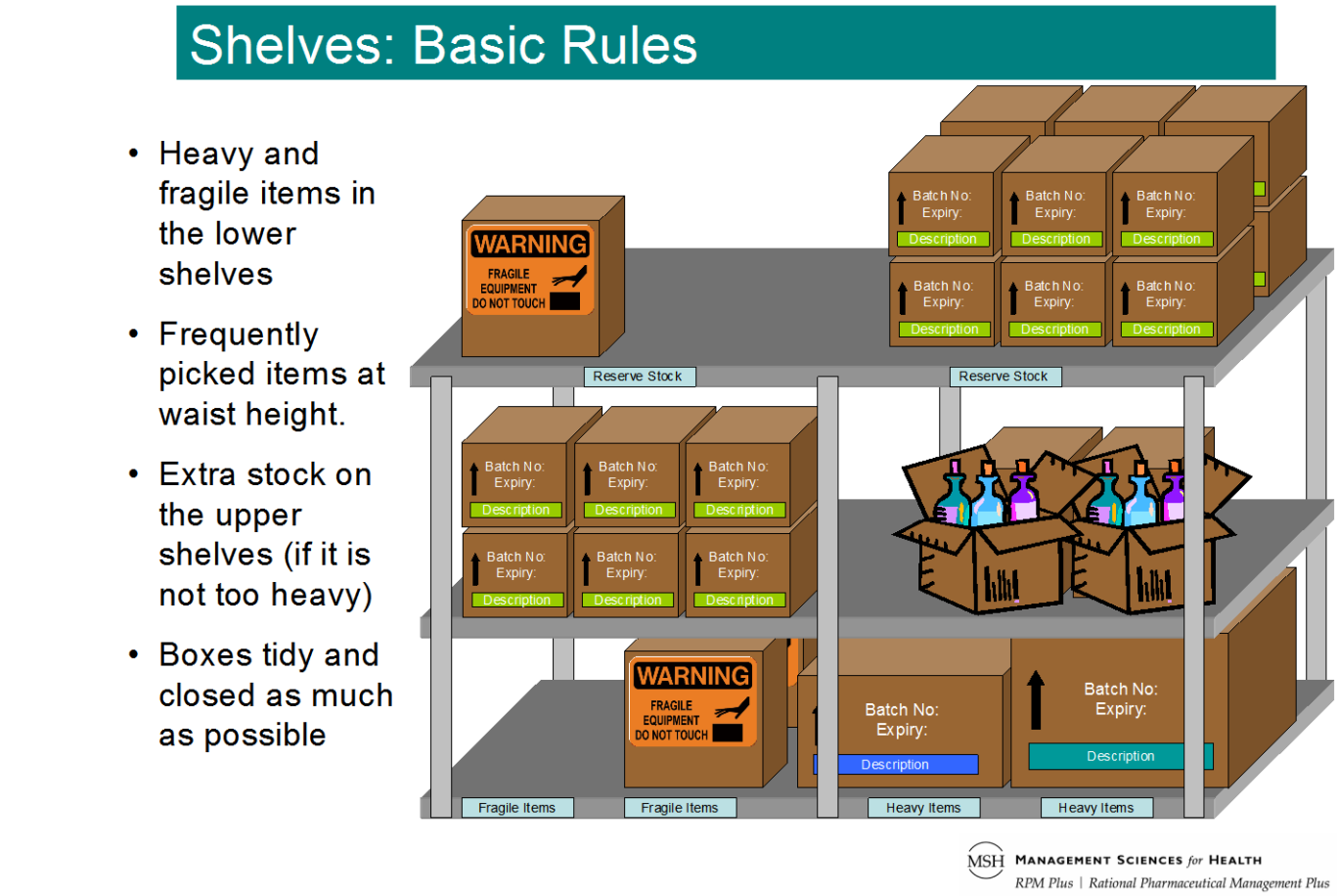
1. Count the number of units for each product received and compares to issue voucher.
2. Record the date and quantity received on bin card.
3. Ensure the expiry date is visibly marked on every package or unit.
4. Arrange products in the storage area to facilitate the first-to-expire, first-out (FEFO) procedure. (See section on stock rotation.)

Remember*: Model 19 is used for received products while model 22 is used for issuing products.*

5.3 Arranging pharmaceuticals in the store

- If you are using pallets (more likely in a central facility than a health center), stack cartons on pallets:
  - at least 10 cm off the floor;
  - at least 30 cm away from the walls and other stacks; no more than 2.5 m high (general rule).

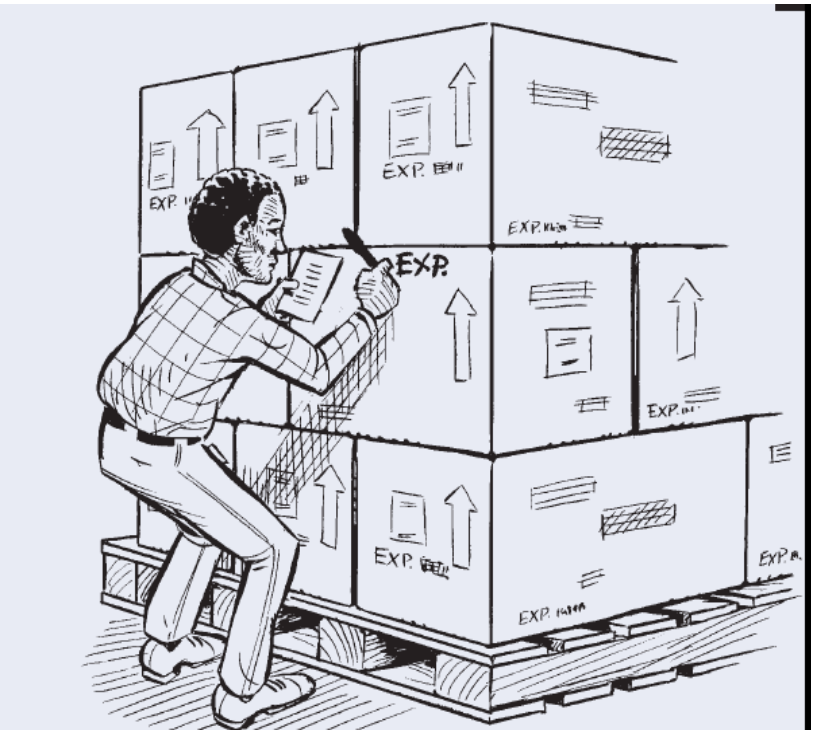




For all storage:

- Follow the manufacturer's or shipper's directions when stacking**,** and follow labels for storage conditions.
- Place **liquid products** on the lower shelves or on bottom of stacks**.**
- Store products that require **cold storage** in appropriate temperature controlled zones.
- Store **attractive and controlled products** in appropriate security zones.
- Separate **damaged or expired** products from the usable stock without delay, and dispose of using established disposal procedures.
- Always store all commodities in a manner that facilitates **FEFO** ("First Expiry First Out") rule for stock management.

- Arrange cartons so **arrows point up** and identification labels, expiry dates, and manufacturing dates are visible.
- If this **is not possible**, write the product name and expiry date clearly on the visible side



- When issuing products, it is important to follow the **FEFO** policy.

- Following **FEFO** minimizes wastage from product expiry.
  - Always issue products that will expire first, ensuring they are not too close to or past their expiration date. The shelf life remaining must be sufficient for the product to be used before the expiry date.
  - To facilitate FEFO, place products that will expire first in ***front of products*** with a later expiry date.
  - Write expiry dates on **bin cards**, so stocks can be sent to facilities at least 6 months before they expire.

5.3.1 Systems for arranging drugs in store room

Medical stores must have a system for classifying or organizing medicines, and must ensure that all employees know the system being used.

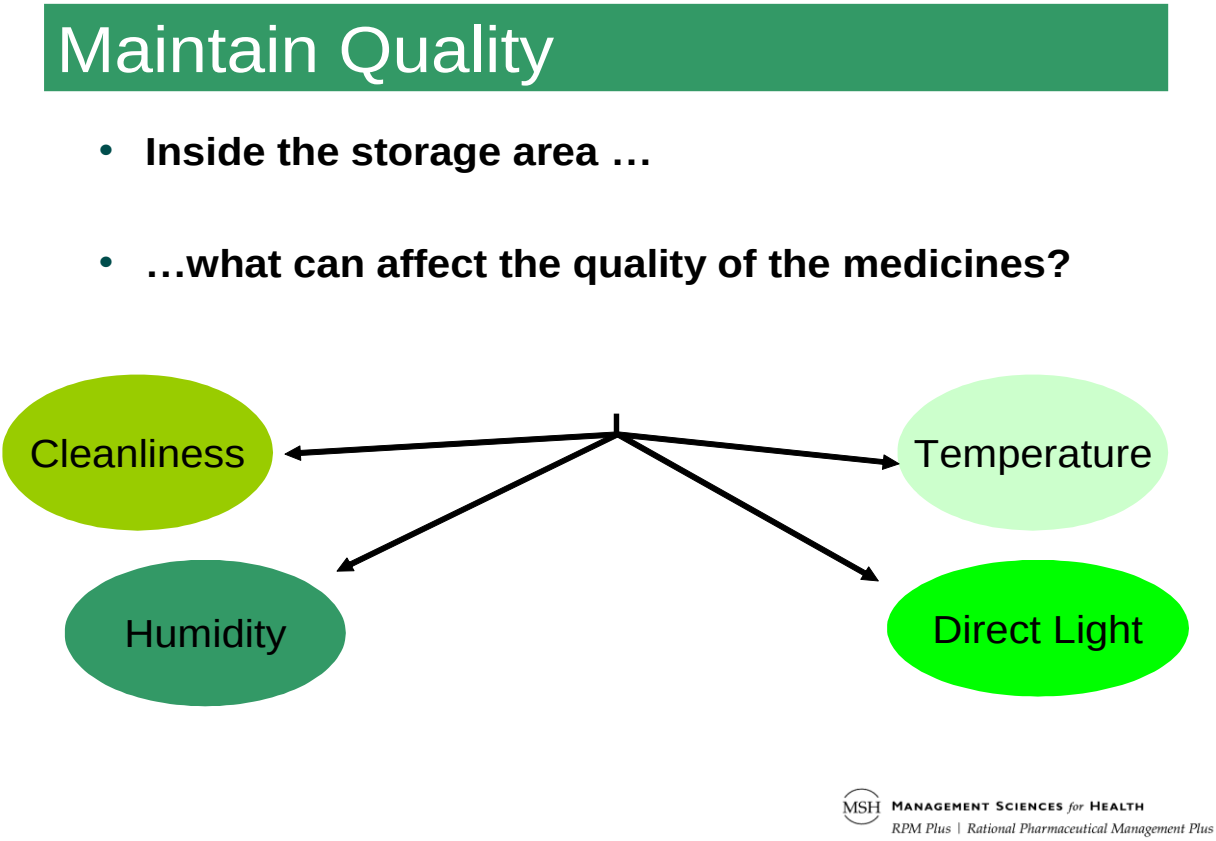
Some common systems for arranging medicines include: -

- **Alphabetical order by generic name:** Often seen in both large and small facilities. When using this system, the labeling must be changed when the Essential Medicines List.
- **Therapeutic or pharmacologic category:** Most useful in small storerooms or dispensaries where the storekeeper is very knowledgeable about pharmacology.
- **Dosage form:** Medicines come in different forms, such as tablets, syrups, injectables, and external use products such as ointments and creams.
- **System level:** Items for different levels of the health care system are kept together.
- **Frequency of use:** Frequently used products that move quickly or often through the store should be placed in the front of the room or closest to the staging area. This system should be used in combination with another system.
- **Random bin:** Identifies a specific storage space or cell with a code that corresponds to its aisle, shelf, and position on the shelf. This system requires computer automation.
- **Commodity coding:** Each item has its own article and location code. This system has the greatest flexibility, but it is also the most abstract form of arrangement.

5.4 Pharmaceuticals storage conditions

Storage conditions of all the pharmaceuticals (drugs, laboratory reagents and chemicals and medical supplies) should be maintained according to manufacturer's recommendation to keep their quality.

Within store room the quality of pharmaceuticals can be affected by the following four conditions depicted in the figure below.



5.4.1 Temperature of storage conditions

The following terms are commonly used in storage of pharmaceuticals (drugs, vaccines, laboratory reagents). Therefore, you are expected to differentiate and use in your store management.

Store frozen*:* Some products, such as certain vaccines, need to be transported within a cold chain and stored at –20°C (4°F). Frozen storage is normally for longer-term storage at higher- level facilities like PFSA central medical store.

Store at 2°–8°C (36°–46°F): Some products are very heat sensitive but must not be frozen. These are usually kept inthe first and second part of the refrigerator (never the freezer).This temperature is appropriate for storing vaccines for a short period of time.

Keep cool*:* Store between 8°–15°C (45°–59°F).

Store at room temperature*:* Store at 15° –25°C (59° –77° F).

Store at ambient temperature*:*

- Store at the surrounding temperature. This term is not widely used due to significant variation in ambient temperatures.
- It means "room temperature" or normal storage conditions, which means storage in a dry, clean, well-ventilated area at room temperatures between 15° to 25°C (59°–77°F) or up to 30°C, depending on climatic conditions.

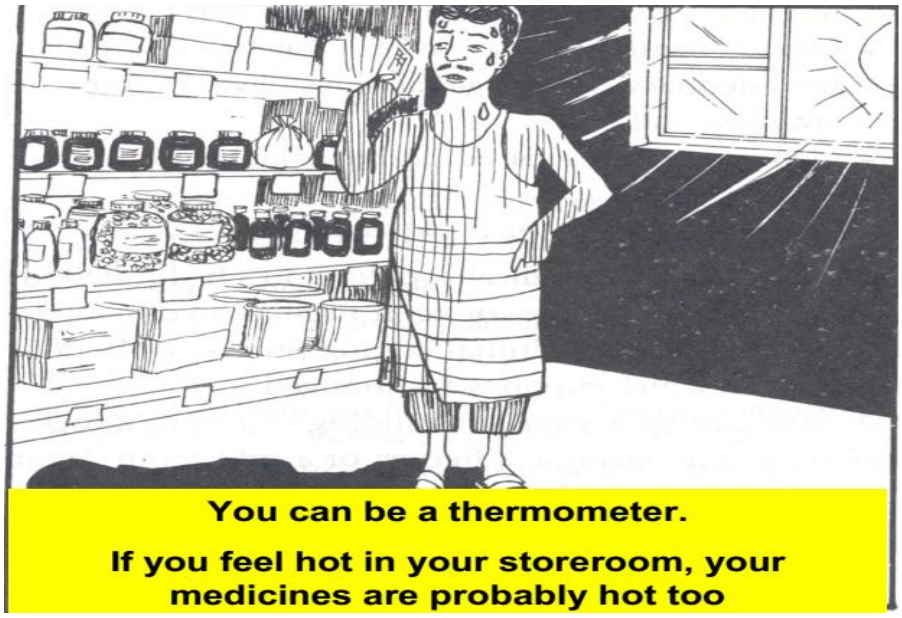
➔ Remember that heat or high temperature will affect many products. It melts ointments and creams and causes other products to become useless. It is important to have thermometers in various parts of the storeroom to monitor temperature

➔ **Monitoring temperature.** Consistently monitor the temperature of the different areas within the storeroom.

– Keep thermometers in various places for monitoring

- Keep the storeroom well ventilated (see section on humidity). For better ventilation, store boxes on pallets and leave room between rows of stacked boxes (see section on arranging products).
- Keep direct sunlight out of the storeroom

➔ But, even if you do not have thermometers, you can still monitor the heat. If you feel hot, your products are probably hot, too



5.4.2 Humidity

Humidity of the store can affect certain pharmaceutical. Thus, when product labeled as "protect from moisture," store the product in a space with no more than 60% relative humidity.

In humid climate, dehumidifiers are useful for preventing moisture damage.If the store room has no dehumidifier, use ventilating fans, expose the area to the light or peon the windows if possible.

Light

Open window

Dehumidifiers

Ventilation: Open the windows or air vents of the storeroom to allow air circulation. Ensure all windows have screens to keep out insects and birds, and either have bars or are not open wide enough for anyone to climb in. Put boxes on pallets and ensure there is space between pallets and the walls of the storeroom

Packaging: Secure all lids. Never open a new container unless necessary.

Circulation*:* Use a fan to circulate fresh (outside) air. In bigger storerooms you may need a ceiling fan.

5.4.3 Sunlight

- Some health products are photosensitive and will be damaged if exposed to light. These include: -
  - Multiple vitamins,
  - Furosemide,
  - Chloropheniraminemaleate,
  - Hydrocortisone,
  - latex products (such as male condoms), and
  - X-ray film.
- To protect products from sunlight
  - Shade the windows or use curtains, if they are in direct sunlight.
  - Keep products in cartons.
  - Do not store or pack products in sunlight.
  - Use opaque plastic or dark glass bottles for products that require them.
  - Maintain trees on the premises around the facility to help provide shade, but check them regularly to ensure that there aren't any branches that can damage the facilities.

5.4.4 Cleanliness of the store

Keep clean your store as dirty materials attract different pests which can damage the quality of stored pharmaceuticals. Some common pests are rats, roaches, ants and

wasps. Spilled items may attract pests. Clean spills and remove broken containers immediately.

To protect against pests follow the following guidelines:

- Inside the storage facility:
  - Regular cleaning to prevent conditions that favor pests.
  - Do not store or leave food in the storage facility.
  - Keeping the interior as dry as possible.
  - Paint or varnish woods.
  - Regular inspection for evidence of pests
- Outside the storage facility:
  - Regularly inspect and clean the outside premises specially areas where garbage is stored.
  - Check for rodent burrows.
  - Using mercury vapor lighting where possible, and locate lighting away from the building to minimize the attraction of pests.

5.4.5 Security of store room

Pharmaceuticals are expensive so that they can be lost through theft. Follow the following procedures to keep the security of your store.

General rule to protect against theft:

- Use double doors and double locks on entrance
- Use burglar bars on window
- Control entry to the pharmacy
- Set rules for staff who handle suppliers to be equally accountable for their actions
- Maintain good control of stock cards and registries to detect theft.

Outside the facility

- During transport:
  - Verify documents E.g. DIC (delivery invoice cards)or GRV Goods receiving voucher(Model 19)
  - Use packing seals
  - Use strong boxes
- In outpatient departments and health centers
  - Set maximum dispensing quantities
  - Record individual prescriptions
  - Allow only pharmacy personnel to dispense

Protection against fire:

- Availability of standard fire extinguishers in every storage facility and inspecting them every 2-3 months to ensure pressures are maintained and the extinguisher is ready for use.
- Service of fire extinguishers at least every 12 months.
- Placing smoke detectors and checking them every 2-3 months.
- Prohibiting smoking in the storage.
- Conducting fire drills every 6 months.
- Emergency exits should be clearly marked and checked regularly for accessibility and any blockage.

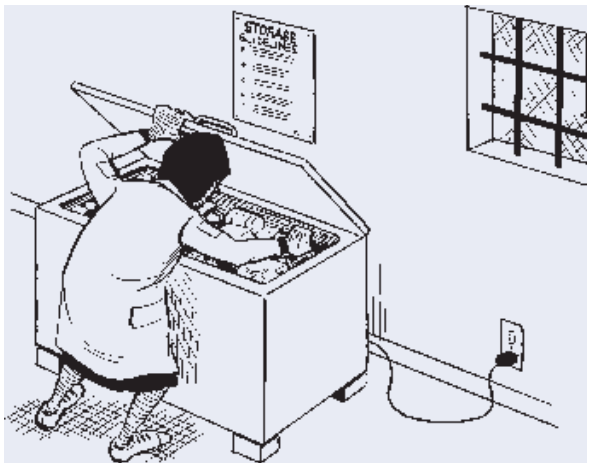
- Display of fire protection signs at appropriate places.
- Use of sand to extinguish fires where there are no fire extinguishers.
  Placing the sand bucket near the door

5.4.6 Vaccine storage and cold chain management

- The potency of vaccines, sera, test kits, and many other items depends on cold storage. Vaccine, in particular, must be kept at precisely controlled temperatures from the point of manufacture to the point of administration. Also daily temperature record should be maintained properly.
- The "cold chain" is a system of transporting and storing vaccines, medicines and laboratory reagents within a recommendedtemperature range of +2 to +8 degrees Celsius (°C).
- For the cold chain management of vaccines, medicines and laboratory reagents we use different types of refrigerators and freezers. So let us look some of their types.

Refrigerators and freezers

- Refrigerators that open on the top are more efficient than vertical ones, because hot air rises while cold air falls.
- The coldest part of vertical refrigerators is at the bottom
- Store products that are sensitive to freezing or very low temperatures on the upper shelves.
- Always have enough frozen icepacks to transport items requiring cold storage in cold boxes and/or vaccine carriers. Use only icepacks filled with water. Do not use icepacks prefilled with other liquids, which are usually blue or green.
- When ordering cold chain equipment, larger facilities should reassess the needs for icepacks and icepack freezer space.



- If there is enough space, place a few plastic bottles of water in the refrigerator. This will help maintain the temperature for a longer period of time if the power is cut off.
- Place refrigerators and freezers with space between and about an arm's length away from the wall. This will increase the air circulation.

Storage of vaccines:

- All vaccines and diluents must be stored in the refrigerator for short term between 2°C and 8°C in a pharmacy that issues to the end- user or clinics.
- For long terms storage -20°C is preferred only for BCG, OPV and measles.
- Do not freeze other vaccines.
- Domestic refrigerator, ice lined refrigerator are used for short term storage and deep freezer for long term storage.

Table 5: Potency& temperature for storage vaccines

Vaccine	Temperature	Potency maintained	Remarks
Oral Polio (OPV)	-20°C	1year	Avoid repeated thawing
	4°C to 8°C	3 months	Keep on ice while using
Bacillus Calmettle Guerine (BCG)	4°C to 8°C	1 years	Reconstituted vaccine, if not used within four hours must be discarded
DiphtheriaPertussis Tetanus (DPT)	4°C to 8°C	2 years	Must not be frozen
Diphtheria, Tetanus (DT)	4°C to 8°C	2 years	Must not be frozen
Measles	0°C to 2°C	2 years	Should be used immediately after reconstitution
Typhoid (TAB)	4°C to 8°C	8 months	Must not be frozen
Tetanus Toxoid (TT)	4°C to 8°C	8 months	Must not be frozen. Unused portion must be discarded
Hepatitis B	4°C to 8°C	4 years	Must not be frozen

Summary

In this unit, you have learned:

- Drugs need to be stored in a specially designed secure area to:
  - Avoid contamination
  - Avoid disfiguration of labels,
  - Maintain integrity of packaging and so guarantee quality,
  - Prevent or reduce pilferage, theft or losses,
  - Prevent infestation of pests.

- Differentiated model 19 and model 22
- Principles arranging pharmaceuticals using shelves and pallet
- Some common systems for arranging medicines include
  - Alphabetical order by generic name
  - Therapeutic or pharmacologic category
  - Dosage form
  - System level
  - Frequency of use
  - Random bin
  - Commodity coding
- Conditions that affect quality of drugs include:
  - Temperature
  - Cleanliness
  - Humidity
  - Direct sunlight
- **The "cold chain"** is a system of transporting and storing vaccines, medicines and laboratory reagents within a recommendedtemperature range of +2 to +8 degrees Celsius (°C).

Self-check

1. Why drugs or pharmaceuticals need to be stored securely?
2. Discuss steps that should be followed while receiving pharmaceuticals at store?
3. Lists systems of arranging pharmaceuticals in store
4. Differentiate the following term temperature related terms that we use in store:
    - Store frozen and Keep cool
5. Define cold chain and describe how vaccines should be stored

6. PHARMACEUTICAL WASTE MANAGEMENT

Objectives

By the end of this unit, you will be able to

- To describe principles of pharmaceutical waste disposal
- Outline the procedures for identification and disposal of pharmaceutical wastes
- To segregate, record and report pharmaceutical wastes

6.1 Introduction

Pharmaceutical products become unusable if failed to with required quality standards (might be manufactured with poor quality) or expired or damaged during transport, storage and handling. Proper management of unusable pharmaceutical products has several objectives.The main objective of which is to prevent harm of people from the reuse or resale of expired, damaged or recalled health care goods as well as harm from sharps.

Another important objective is to protect environment which can be harmed by inappropriate disposal of drug products or substances contained in certain health care facility.

Disposal of unusable health care goods must be carried out in complete transparency towards the health authorities, public information must be handled carefully as it may be politicized and sensationalized.

6.2 Types of waste at health facility

6.2.1 Non-medical waste

These types of waste include: compost leaves, sticks, weeds, and trimmings from shrubs and trees, if feasible. Designate a separate area for composting.

Cardboard cartons: If possible, recycle cardboard; otherwise, treat like ordinary rubbish.

Ordinary rubbish: Where municipal solid waste facilities exist, dispose of ordinary rubbish in the municipal dump. Otherwise, burn or bury it.

Human waste: Use pit latrines or other toileting facilities to dispose of all human wastes

6.2.2 Health care wastes

Sharps waste: Single-use disposable needles, needles from auto-disable syringes, scalpel blades, disposable trocars, sharp instruments requiring disposal, and sharps waste from laboratory procedure

Other hazardous medical waste: Waste contaminated with blood, body fluids, human tissue; compounds such as mercury; pressurized containers; and wastes with high heavy metal content.

Pharmaceuticals: Expired, damaged, or otherwise unusable medicines, chemical, reagents and items contaminated by or containing medical substance

6.3 Steps for Pharmaceutical waste disposal

Disposal – Steps and Methods

A series of **steps** need to be taken when disposing of unwanted pharmaceuticals:

Step 1- Decision: The hospital, district or regional pharmacist or organizations with pharmaceutical programs decide when action needs to be initiated, because of an accumulation of unwanted pharmaceuticals which are unfit for human consumption and for veterinary treatment.

Step 2 –Approval: Approval and sanctioning of disposal of pharmaceuticals must be sought from the appropriate authority. This authority will differ from country to country and may be the department responsible for pharmaceutical management within the ministry of health, the drug regulatory authority, or the regional or local health authority (pharmaceutical officer). FMHACA/Regional regulatory wing is the responsible body in Ethiopian context.

Step 3- Planning:-Planning, in terms of funding, necessary expertise, human resources, professional time, space, equipment, material and available disposal options will be required. This is essential before practical steps can be taken to start disposal.

Step 4 -Forming work teams: -Work should be conducted by teams consisting of supervising pharmacists and general medical workers, who are preferably pharmaceutical technicians or experienced pharmaceutical warehouse personnel. The size of each team, and the ratio of experts to workers, will be determined by the volume and composition of the stockpiles, and working conditions at the sites.

Step 5 -Health and safety of work teams:-All workers should wear appropriate protective equipment including overalls and boots at all times, and gloves, masks and caps when appropriate. Masks should be worn when tablets or capsules are being crushed as part of the disposal technique and when there is a risk of powders being liberated. Particular care is required when handling anti-neoplastic

Step 6 –Sorting:-The objective of sorting is to separate the pharmaceuticals into separate categories for which different disposal methods are required. The separation should be made into those that can be safely used and returned to the pharmaceutical supply system and those that require disposal by different methods. For example, controlled drugs (e.g. narcotics), anti-neoplastic drugs and antibiotics all require special methods of disposal. Substantial investment in human resources may be required for identifying and separating pharmaceuticals.

Step 7:- Disposal:-Disposal options vary considerably with situations and the ideal solution may not be feasible. As result using the simplest,safe stand most practical alternatives is important.

Note the following points during disposal of pharmaceutical:

1. Controlled substances (e.g. narcotics and psychotropic) require tight security and control measures. In some countries, scavenging of material from landfills is a frequent problem, and disposed drugs may be recovered and sold by the scavengers. Measures are therefore necessary to prevent diversion during sorting, and pilfering of drugs from land fill.
2. All workers should wear appropriate protectiveequipment including over all sand boots at all times, and gloves, masks and capsule when appropriate .Masks should be worn when tablets or capsules are being crushed as part of the disposal technique (forexample,inertization)andwhenthereisariskofpowdersliberation.Particularcareisrequire d when handling anti -neoplastic.

6.4 Methods of waste disposal

Burial pits and encapsulation are suitable in locations without shallow groundwater and for small volumes of waste.

Burial pits: The bottom of the pit should be 1.5 m above the groundwater level, 3–5 m deep, and lined with a substance of low permeability, such as clay. Surround the opening with a mound to keep run-off water from entering the hole, and build a fence around the area. Periodically, cover waste layers with 10–15 cm of soil.

Encapsulation: Cement-lined pits or high-density plastic containers or drums are filled to 75% capacity with health care waste. The container is then filled with plastic foam, sand, cement, or clay to immobilize the waste. The encapsulated waste is then disposed of in a landfill or left in place if the container is constructed in the ground.

Incineration: Medium- and high-temperature incineration devices require a capital investment and an operations and maintenance budget. They operate on fuel, wood, or other combustible material and produce solid ashes and gases. Pollutants are emitted to varying degrees. The ash is toxic and must be buried in a protected pit. Combustible waste is reduced to incombustible waste with a decreased volume

The high temperatures kill microorganisms medium-temperature incinerators, commonly a double- chamber design or pyrolytic incinerator, operate at a medium-temperature combustion process (800 °–1,000 °C).

High-temperature incinerators, recommended by WHO, treat health care waste at a temperature >1,000°C.When operated by staff trained in correct use and maintenance, incineration in a device like this one— completely destroys needles and syringes n kills microorganisms reduces the volume of waste generates less air pollution than low-temperature burning.**Note:** Incinerate pharmaceuticals only if absolutely necessary.

Low-temperature burning: Burning devices not exceeding 400° C include single-chamber brick hearths, drum burners, and burning pits. They burn incompletely and do not fully destroy waste.

They may not kill microorganisms. Given these shortcomings,

- low-temperature
- Burning should be used only as a short-term solution.

Burn* andbury*: Pit burning is a low-cost but relatively ineffective means of waste disposal. A fence should surround the pit to prevent children, animals, and others from coming into contact with the waste. The pit location should avoid walking paths (high-traffic areas). The fire, usually started with a petroleum-based fuel and allowed to burn, should be supervised by designated staff and located down-wind of the facility and residential areas. The low-temperature fire emits pollutants, and the ash and remaining material should be covered with 10–15 cm of dirt.

Othermethods*:* In addition to the common methods, other methods are used in some settings, including needle removal/ needle destruction, melting syringes, steam sterilization (autoclaving and hydroclaving), and microwaving (with shredding).

Managing health care waste is a comprehensive program that requires support at all levels of the health care system. Staff involved in health care waste management must be given training and support.

6.5. Waste types not to be incinerated

- Pressurized gas containers.
- Large amounts of reactive chemical waste.
- Silver salts and photographic or radiographic wastes
- Waste with high mercury or cadmium content, such as broken thermometers, used batteries, and lead-lined wooden panels.
- Sealed ampoules or ampoules containing heavy metals

Pharmaceutical disposal. It is very important to dispose of pharmaceuticals properly because there can be very negative consequences to improper disposal. Improper disposal can result in—

- Contaminated water supplies
- The diversion and resale of expired or inactive medicines
- Improperly incinerated products, which can release toxic pollutants into the air.

❖ Particular attention must be given to disposal of the following categories of pharmaceuticals—controlled substances, such as:

- narcotics and psychotropic medicines
- anti-infective drugs
- antineoplastics
- cytotoxic
- anti-cancer drugs, toxic drugs
- antiseptics and disinfectants

Proper use of safety boxes

√ Safety boxes or sharps containers are puncture- and water-resistant, impermeable containers. When used correctly, they reduce the risk of skin-puncture injuries that may spread disease.

√ Do not recap syringes before disposal.

√ Place the syringe and needle in the sharps box **immediately** after use.

√ Keep the sharps box where the injections are given.

√ Do not overfill the sharps containers (about 3/4 full).

- √ When 3/4 full, close box tab completely to cover the opening and tape it shut.
- √ Store the box in a safe and secure
- √ location until ready for final disposal.
- √ n Do not empty and refill sharps boxes. Fill once and
- √ discard immediately.
- √ See annex 2 for more information about waste disposal.

Table 6: Different disposal methods base on drug types

Category	Disposal Methods	Comments
Solids Semi-solids Powders	Landfill Waste encapsulation Waste inertization Medium and high temperature incineration (cement kiln incinerator)	No more than 1% of the daily municipal waste should be disposed of daily in an untreated form (non- immobilized) to a landfill.
Liquids	Sewer High temperature incineration (cement kiln incinerator)	Antineoplastics not to sewer.
Ampoules	Crush ampoules and flush diluted fluid to sewer	Antineoplastics not to sewer.
Anti-infective drugs	Waste encapsulation Waste inertization Medium and high temperature incineration (cement kiln incinerator)	Liquid antibiotics may be diluted with water, left to stand for several weeks and discharged to a sewer.
Controlled drugs	Waste encapsulation Waste inertization Medium and high temperature incineration (cement kiln incinerator)	Not to landfill unless encapsulated
Aerosol canisters	Landfill Waste encapsulation	Not to be burnt: may explode.
Disinfectants	Use To sewer or fast-flowing watercourse: small quantities of diluted disinfectants (max. 50 liters per day under supervision)	No undiluted disinfectants to sewers or water courses. Maximum 50 liters per day diluted to sewer or fast-flowing watercourse. No disinfectants at all to slow moving or stagnant

		watercourses.
PVC plastic, Glass	Landfill	Not for burning in open containers
Paper, cardboard	Recycle, burn, landfill	

Summary

In this unit, you have learned:

- Types of waste at health facility

  - Non-medical waste or Garden rubbish

    - Cardboard cartons
    - Ordinary rubbish
    - Human waste:

  - Health care wastes
    - Pharmaceutical wastes
    - Sharp material wastes
    - Other hazardous medical waste:
- Steps in pharmaceutical waste disposal
- Methods of waste disposal
    - Burial pits:
    - Encapsulation:
    - Incineration
    - Low-temperature burning
    - Burn and bury
    - Other methods
- Waste types not to be incinerated

- Pressurized gas containers.
- Large amounts of reactive chemical waste.
- Silver salts and photographic or radiographic wastes. nHalogenated plastics such as polyvinyl chloride (PVC).
- Waste with high mercury or cadmium content, such as broken thermometers, used batteries, and lead-lined wooden panels.
- Sealed ampoules or ampoules containing heavy metals

Self-check

1. Write types of waste at health care facilities
2. Describe steps used in pharmaceutical waste disposal
3. List method of waste disposal

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Annex-1

Internal Facility Report and Resupply Form

Name of Dispensing Unit:_____Reporting Period From:_____To:_____

Maximum Level (ML):_____

		COMPLETED BY UNIT				COMPLETED BY STORE			
Ser. No.	**Item**	**Beginning Balance**	**Quantity Received**	**Loss/ Adjustment**	**Ending Balance**	**Calculated Consumption** E = A+B+/-C-D	**Maximum Quantity** F =E * 2	**Quantity Needed to Reach Max.** G = F – C	**Quantity to be Supplied**
		A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
Remarks :									
Completed by (Name, Date and Signature) :						Completed by (Name, Date and Signature) :			
Approved by (Name, Date and Signature) :									

Annex-2

Report and Requisition Form (RRF)

Health Facility: _____ Region: _____ Zone: _____ Woreda: _____

Reporting period From _____ (month/day/year) to _____ (month/day/year)

Maximum Stock Level:4 Mos:**Emergency Order Point**: 0.5 Mos

No.	Product Code	Product Description	Unit of Issue	**Report Part**						**Requisition Part**		
				Beginning Balance	Quantity Received	Losses/ Adjustments	Ending Balance	Calculated Consumption	Days Out Of Stock	Maximum Stock Quantity	Quantity needed to reach Max	Quantity Ordered
				A	**B**	**C**	**D**	**E = A + B +/- C – D**	**F**	**G = 120*E /(60 – F)**	**H= G-D**	
1												
2												
3												
4												
5												
Products with shelf life ≤6 months (S/No, Quantity and Expiry date):								Remarks:				

Completed by: _____ Signature: _____ Date: _____

Verified by: _____ Signature: _____ Date: _____

Approved _____ Signature : _____ Date : _____

MODULE SYLLABUS

Module title:-Drug Supply Management I

Module code: PRA2 M3 1017

Nominal duration: 80 h**ours** (**two weeks**) Theory 50 hrs. Practice 30 hrs.

Module Description: This module aims to provide the learners with the knowledge, skills and right attitudes for maintaining a dispensary stock control system, according to standard operating procedures in compliance with statutory and legal requirements.

Unit of Competencies

- Assist in Dispensary Stock Control

Module Objective

By the end of this module, you will be able to

- Apply pharmaceutical procurement procedure
- Perform ordering and receiving dispensary stock
- Perform drug storage tasks
- Perform dispensary stock control

Teaching/learning methods

- Interactive presentation
- Group work
- Guided practices at health facilities
- Case studies

Teaching/learning materials

- Students learning module DSM-I
- LCD projector
- Power point slides
- IFRR formats and Bin cards

- Bin cards/stock record system
- SOP for storage
- Medicines Vaccines, Biological products
- Refrigerator
- Dispensary room
- Daily Dispensary Registry
- Expiry register form
- Recall and return forms

Methods of assessment

- Quizzes
- Tests
- Objective written exam
- Written exercises
- Assignments(group and individual)
- Written test/oral questioning on underpinning knowledge
- Oral questioning
- Structured observation
- Case based exam
- Short answer
- Structured feed back
- Observation

Module Schedule

Week	Learning Activity	Required Reading / Assignment
Week one	**Day one** Interactive presentation (2 hours) - To describe Pharmaceutical management cycles - Lists principles of Good pharmaceutical procurement practices Group Activity (2 hours) • Discuss drug supply management cycles Interactive presentation (2 hours) • Describe pharmaceutical procurement methods • Describe drugs purchasing models Independent study(2 hours) **Day two** Group Activity (4) hours • Discussion pharmaceutical procurement methods& purchasing models Interactive presentationand discussion(2 hours) • List drugs selection criteria Interactive presentation (2 hours) • Describe morbidity and consumption methods to quantify pharmaceuticals needs for health facilities **Day three** Group Activity (4 hours) • Determine drug quantity using morbidity methods for health facilities Group Activity (4 hours) • Determine drug quantity using consumption methods for health facilities **Dayfour** Interactive presentation and discussion (2hours) • Perform stock control Independent reading (2hours)	

Week 2	• Perform stock control Skill Lab (4 hours) • Perform stock control **Day five** Interactivepresentation(2 hours) • To identify steps in dispensary stock ordering • To identify stock receiving steps Skill Lab (4 hours) • Use IFRR to request stock for dispensary • Arrange stocks on shelve Guided practice and group activity (2 hours) - To enter dispensary stock in to stock records (bin card) **Day six** Guided practice and group activity (2 hours) - To enter dispensary stock in to stock records (bin card) Interactive presentation(2hours) - Recognize the essential elements of current good storage practices - Identify storage conditions Skill Lab (4 hours) • Observe storage conditions • Use Standard operating procedures (SOPs) for pharmaceuticals storage	
	Day one Skill Lab (4 hours) • Arrange medicines, vaccines and biological products in refrigerator • To identify dispensary stock records and documentation - To enter dispensary stock in to stock records (bin card) Group Activity and discussion (4hours) - To identify dispensary stock levels (min-max stock levels) **Day two** Guided practice and group activity (4 hours) - To investigate dispensary stock discrepancies Guided practice and discussion (4) - To identify procedures and formats used for product recall and return forms.	

	- Bin card exercise **Day three** Interactive presentation and group discussion (2 hours) - To describe principles of pharmaceutical waste disposal. - Outline the procedures for identification and disposal of pharmaceutical - Wastes Independent study (2hrs) Skill Lab (4 hours) - To segregate, record and report pharmaceutical wastes - To enter dispensary stock in to stock records (bin card) - Independent study - To enter dispensary stock in to stock records (bin card) - IFRR format - Filling recall and returned stocks on bin cards - Exam	